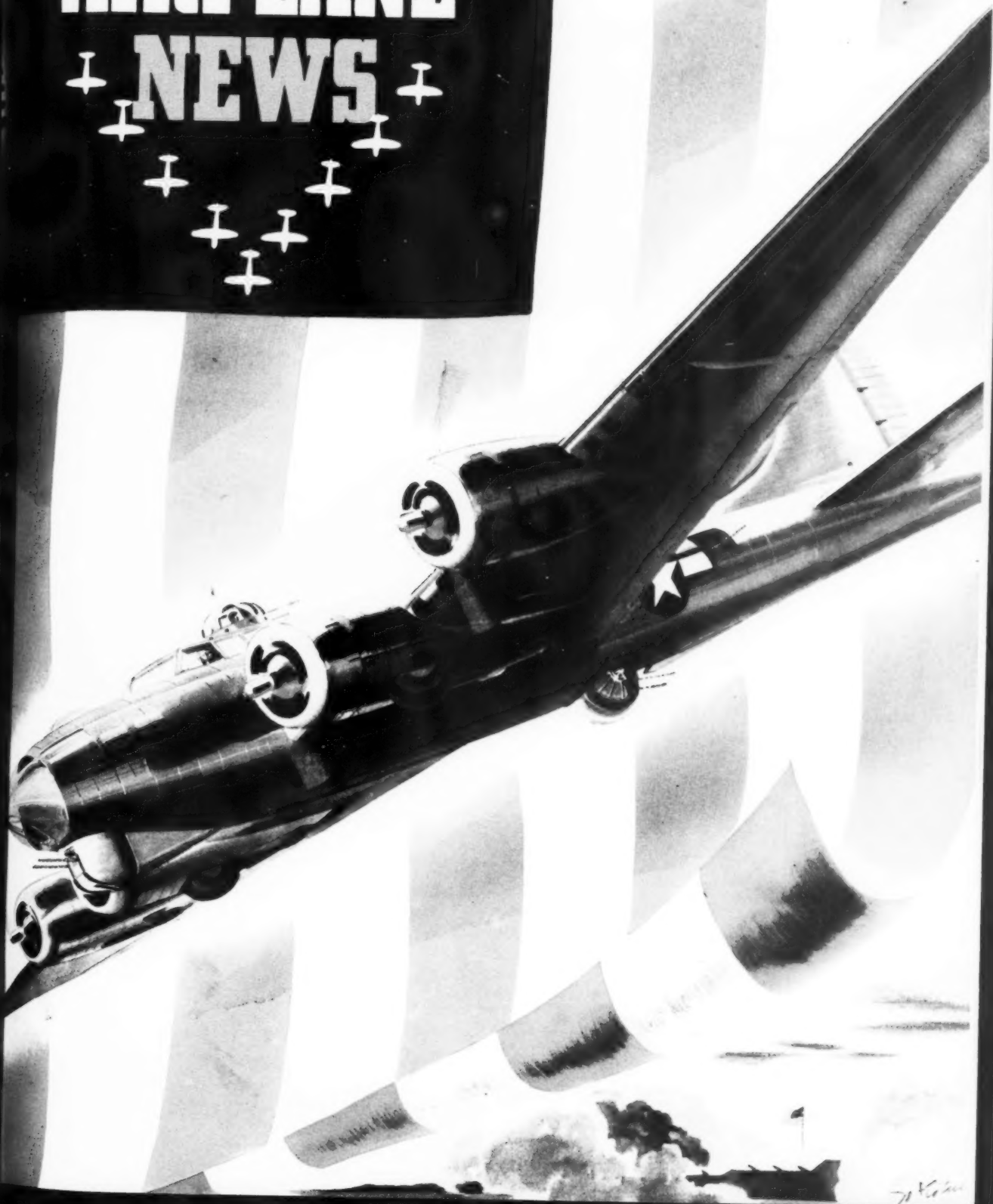


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Glistening Ebony

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MODEL AIRPLANE NEWS

AUGUST, 1944

Vol. XXXI, No. 2

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ON THE sixth hour of the sixth day of the sixth month of 1944 the United Nations sailed across the Channel and set foot on Occupied Europe, notably in the Normandy peninsula, to commence the long awaited invasion. The battle will be long, hard and trying but with every soldier, every worker and every citizen of the freedom loving peoples of the world behind the attack with their hearts and their labors, the enemy cannot prevail against us. Let us fight and work and

The use of parachute troops was large but had been anticipated. The combined assault of paratroopers and glider borne infantry spearheaded the entire attack and its success cannot mean anything but complete vindication for the beliefs of the few proponents of this type of vertical envelopment theory in modern warfare.

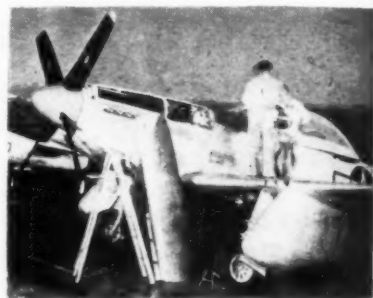
Glider borne infantry has been used successfully in the Burma campaign and these twin successes have given credence to the theory of some high ranking AAF



First photo of giant British Hamilcar glider. Span is greater than Avro Lancaster

pray for a speedy and merciful ending to this blackout of mankind in the Twentieth Century and make the finish so complete and so strong that not again will it plague the lives of the earth's human beings.

Out of the maelstrom of the early days of the invasion came one salient tactical surprise: the use of glider borne troops for the initial landings. You may recall, many months ago, the complete cancellation of the glider program including not only the manufacture of gliders but the training of glider pilots. No news came to the fore in the ensuing months and it was believed widely that the use of glider borne troops had been dismissed as a tactical weapon in warfare. And now comes the invasion and the delivery of more than one thousand American gliders alone in a single attack. The British glider troops were present, too, in large numbers and the combined assault in its weight and numbers came as a very great surprise both to the enemy and to ourselves.



North American Mustang transcontinental record breaker mounted unique wing tanks

officers that the aerial delivery of troops makes ground encirclement an impossibility. No longer need there be "Lost Battalions" which are either surrounded and liquidated or starved into surrender for the aerial delivery of food and ammunition as well as troops has been proved

(Turn to page 58)



Soviet Lagg 3 fighter on wooden landing strip. Plywood fighter heavily armored



The "Rambler" Roars into Rangoon

This morning you're flying with the crew of the "Rangoon Rambler" . . . Crouched in the glassed-in nose beside you, Lt. Guy Spotts, the navigator, studies a map spread across his knees, checks off landmarks as they slide past underneath. Suddenly he peers ahead . . . speaks into his throat-microphone: "Pilot from navigator. There she is, Rote. We can see the target now. Alter course to three-three-zero."

"Roger!" Capt. Raymond Rote, the pilot, eases the big B-24 around and straightens out on his new course.

Then you see it . . . a splash of flame against the green horizon . . . the great, gold-domed Shwe Dagon Pagoda that towers over Rangoon. You're getting close . . . and the crew gets set. Lt. Robert Currie, the bombardier, fiddles with the knobs on his bombsight. Capt. Gordon Wilson, co-pilot, gives the instruments a last-minute check.

Now you're over the target . . . a flock of pot-bellied Jap cargo ships squatting there in the river's bend. The "Rambler" lurches and bucks as she ducks through bursts of ack-ack and goes into her bombing run.

Your heart pounds hard. Then Currie comes in on the intercom . . . cool as if he were ordering cokes at the Assam Officers Club: "Pilot from bombardier. Bombs away! Let's get out of here, pal!" Looking back and below, you watch the formation's bombs bullseye the target. A freighter goes up in a blast of fire

and black smoke. The ship beside it explodes. Flames break out from a third. And a fourth. Currie and the other bombardiers were "on the beam" today. Rote banks the Lib around steep, and you high-tail for home. You're congratulating yourself when . . . "Fighters at four o'clock—high!" somebody yells. You look up and see a formation of Japs sweeping out of the sun.

Now it's the gunners' turn. And between squirts of their big, twin-50's they keep up a running pep-talk:

"There goes his wing down! He's coming in! This one's my meat, Salley!"

"Hey, skipper—kick her over a little. I want a good shot at this guy."

And two Japs spiral down in flames, and the rest decide to quit. That's all for today. You look around at the crew, relaxing now, shooting the breeze, adding up the score. You think of the ribbons each man has won.

And it makes your chest puff out with pride to be flying with guys like these . . . to be wearing the wings of the AAF—the "greatest team in the world!"

U. S. ARMY RECRUITING SERVICE



FLY AND FIGHT WITH THE



THE "RANGOON RAMBLERS": Standing: Sgt. Ferdinand Knechtel, gunner; Capt. Raymond Rote; Capt. Gordon Wilson; Lt. Guy Spotts; Lt. Robert Currie; Sgt. Joseph Willis, gunner. Seated: Sgt. John Craigie, Sgt. Carl Paak, Sgt. Adolph Scolavino, Sgt. Edward Salley, gunners.

MEN OF 17...



if you want to fly on the "greatest team in the world," an AAF air combat crew . . . go to your nearest AAF Examining Board . . . see if you can qualify for the Air Corps Enlisted Reserve. If you qualify, you will receive this insignia . . . but will not be called for training until you are 18 or over.

When called, you will be given further tests to determine the type of training you will receive. If you are trained as a gunner or technician gunner, you will go into actual combat as a non-commissioned officer. If your apti-

tudes are outstandingly high, you may be trained as a bombardier, navigator or pilot, and graduate from training as a Flight Officer or Second Lieutenant. But whatever your job on an AAF air combat crew you will be the best-trained flier in any army on earth.

For pre-aviation training, see your local Civil Air Patrol officers. Also see your High School principal or adviser about recommended courses in the Air Service Division of the High School Victory Corps. Ask about the opportunities for college training through the Army Specialized Training Reserve Program.

For information on Naval Aviation Cadet Training, apply at nearest Office of Naval Officer Procurement. This advertisement has the approval of the Joint Army Navy Personnel Board.

GREATEST TEAM IN THE WORLD

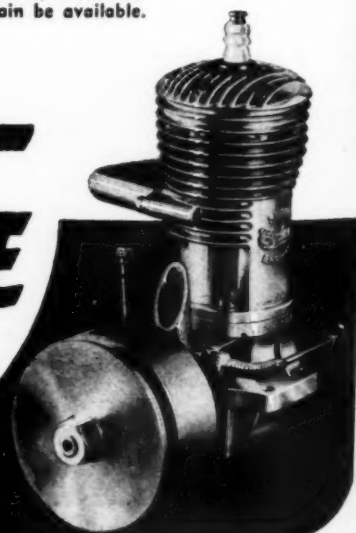
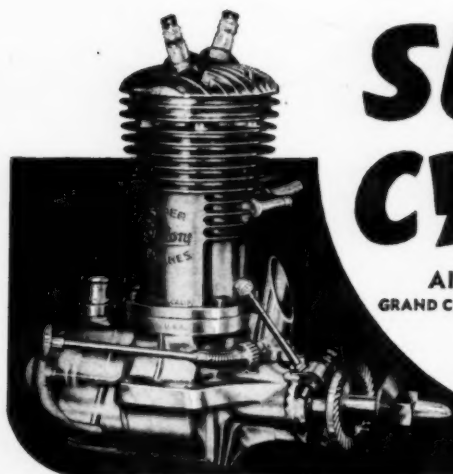
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CAREER
IS NOW AT STAKE

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Tech ad carefully—clip the
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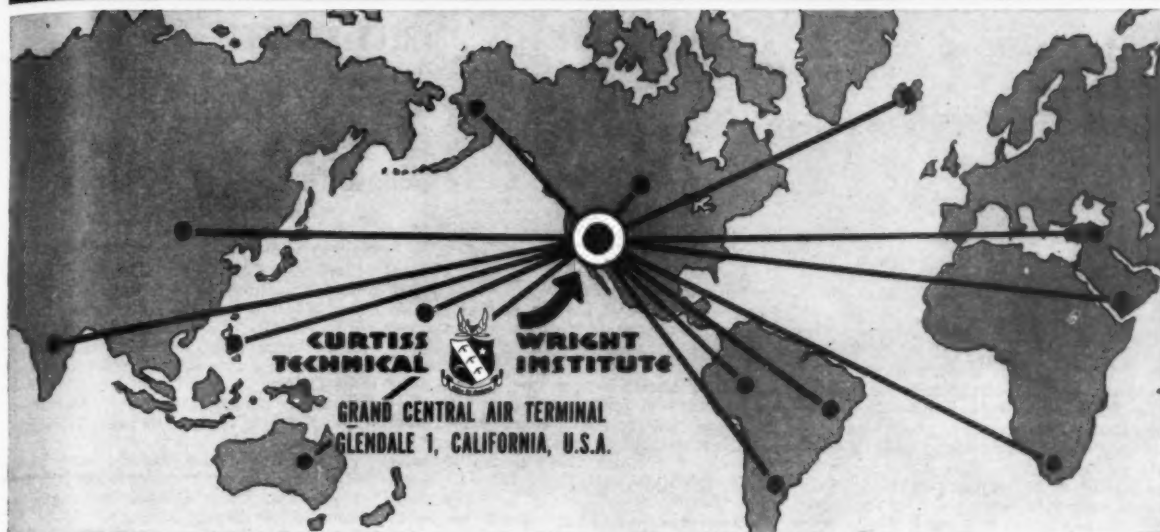
TODAY—the makers of SUPER-CYCLONE engines are heavily engaged in war production . . . (aircraft and engine repairs, maintenance and overhaul) . . . requiring superior craftsmanship and precision. However, when the war is won these same high quality improved engines will again be available.

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The fame of the Royal Air Force is built on the men who made it great. Here are their personal histories.

by CHARLES KENNETT

'the Bird and the Crown'

THE crest of the Royal Air Force consists of an albatross in flight with a crown superimposed above; underneath is the motto: *Per Ardua ad Astra*. The literal translation 'through difficulties to the stars' is so apt when one considers the deeds and exploits of individuals who have built up, and made, the Royal Air Force what it is today: men such as Tedder, 'Mary' Coningham, Billy Bishop, Harry Broadhurst, Bert Harris, 'Murderer' Harris, as the Germans call him,—and a host of others.

It is of these men and their performances I wish to write, and by so doing show how the individual himself played the greatest part in building up the *esprit de corps* of the Royal Naval Air Service and the Royal Flying Corps, until their amalgamation which brought about the creation of the Royal Air Force in April 1918.

Then, although there were almost twenty-one years between World War I and World War II, certain sections of the Royal Air Force were almost continuously on active duty, either on the north-west frontier of India, Palestine, Mesopotamia or somewhere in the middle east.

As proof of how great a part the individual plays in aerial warfare, and how specific examples lead to heighten the morale of a group, there is the amazing case of Wing Commander Lionel Cohen, D.S.O., M.C., D.F.C.

Here it is well to explain the five principal decorations which can be awarded to members of the Royal Air Force. The V.C., the highest decoration for bravery, stands for Victoria Cross; the actual bronze used in the decoration is taken from a cannon used in the Crimean War of 1853-1856. The next decoration is the D.S.O., Distinguished Service Order;

then comes the M.C., Military Cross, no longer awarded to the Royal Air Force, but given to officers for bravery in the Royal Flying Corps when it was a part of the army before the Royal Air Force was formed. In its place we now have the Distinguished Flying Cross, only won on active combat duty; any other exceptional piece of meritorious flying may bring about the award of the A.F.C., Air Force Cross. Knighthoods, such as the K.C.B., Knight Companion of the Bath, is given to Senior Officers for service and devotion to duty.

So, to continue with W/C Cohen, who was born 1875 in South Africa and first saw active service in that country during the Matabele Campaign of 1893. In this present war he has made 45 operational flights with a total of 500 hours. This is the remarkable part: at the age of sixty-seven he was wounded in the head dur-

PORTAL



TEDDER



ing an attack on the pocket battleship *Lutzow* in Norwegian waters; recovered from that, a year later he was awarded the D.F.C. for assisting in the sinking of a submarine in the North Atlantic. This is a record of which the Royal Air Force is justly proud, and when such men command a group the personnel serving under them naturally attempt to emulate their spirit.

The vast complexity of the Royal Air Force—where in Great Britain alone there are actually eight separate Air Force commands, such as bomber, fighter, coastal, etc.—was not arrived at in a short period. We have to remember it was not until 1908, almost five years after the Wright brothers made their historic flight at Kitty Hawk, N.C., that the first flight of a heavier-than-air machine took place off English soil; and it was not until 1911 that the British War Office saw the possibilities of aircraft for reconnaissance work, although in the Franco-Prussian War of 1875 captive balloons had been used for that purpose by the Germans.

Then in 1912, the Royal Flying Corps was formed with its opposite number, the Royal Naval Air Service, as part of the Fleet Air Arm. Few people today remember 'Boom' Trenchard, yet it can be said he was the father of the Royal Air Force. His entry into the Royal Flying Corps in 1912 is remarkable in itself. He was then a major in the Royal Scots Fusiliers. It was pointed out to him by the War Office that forty was the age limit for a man to learn to fly in the service, and there was only one week to go before his fortieth birthday. Applying for leave, at his own expense, he learned in six days sufficient of the art to earn his wings.



HARRIS

It must be remembered that training in those days was not the same as at the present time. Even in 1917, when the writer learned the art, dual instruction consisted of circling the airdrome, with the instructor hanging on to the dual controls and yelling at the pupil; the duration of such instruction was from two to three hours. Further, it was considered sufficient in those days for a pilot to have from sixteen to twenty hours solo to be ready for active duty.

As a further comparison of training

during the last war and this war, the difference in the casualties speak for themselves. During the six weeks I was at training school in 1917 I never saw the flag in any position but half mast. At that time there was a current idea that the air for flying was better at day-break, and as every day without exception there was at least one fatality during early morning flying, the flag was always at half mast position. In 1918 when American pilots were training at

(Turn to page 28)

DOUGLAS

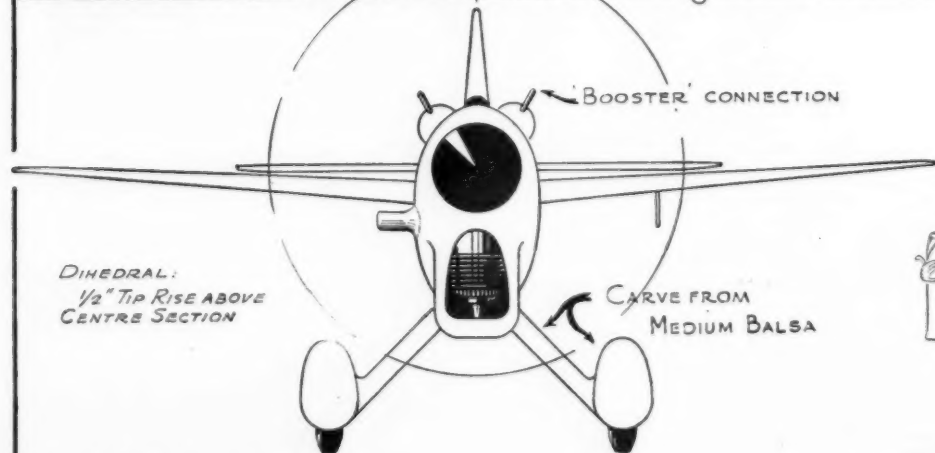
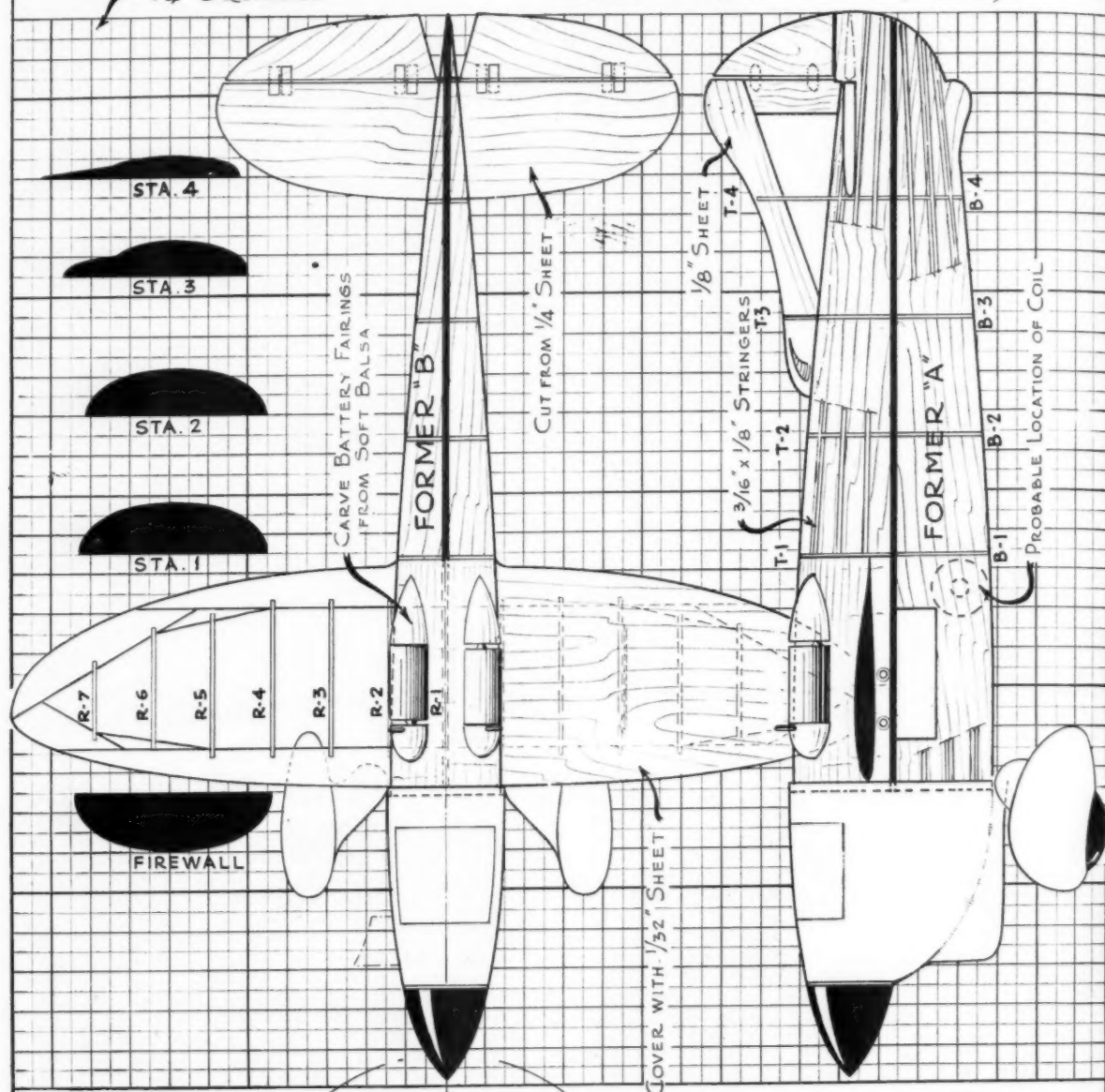


LEIGH-MALLORY



$\frac{1}{4}$ " SQUARES

SCALE OF DWG. - 3" = 1'0" ($\frac{1}{4}$ Size)



Designed by J.S. Lock - Mount Royal Model Airplane Club.



Fury

Eye-appeal with sky-appeal, that's this super-hot control line job.

by JACK S. LUCK



THE other day I was thinking to myself how unfortunate it was that most control line ships were so ugly. "Of course," I said, "aerodynamic efficiency in models just doesn't lend itself to a design of clean and appealing lines."

I was just at the point of starting to muse on some other weighty matter when a soft derisive chuckle reached my ear. Sure enough, there perched on my right shoulder was my favorite gremlin, Mr. Mac. "Oh Yeah!", Mr. Mac snorted, "Listen boy, if you'd only use that so called brain of yours you'd realize that good functional design can (and frequently does) increase efficiency of an article whether it be refrigerator, waffle iron or airplane. Furthermore," Mr. Mac continued, "I will now show you how to make a hot ship both hot and sleek." So saying, he snatched up an assortment of French curves, Copenhagan sweeps, a pencil and went furiously to work. The results of Mr. Mac's efforts are presented perspectively.

When the ship is attempted by more experienced builders the method of construction is entirely optional. The plan and elevation with several sections are drawn to 1/4 scale on squared paper, making it easy to preserve accurate contours when enlarging to full size. The fuselage can be carved and hollowed out from solid medium soft balsa, but, as block balsa is sometimes hard to get, perhaps the "plastic" type of construction (dope and paper laminations) would be better.

The "plastic" fuselage is my own preference. There is, however, a rapid and easy way of making the fuselage that is quite unusual. The plan view and side elevation, excepting the cowl, is trans-

ferred onto 1/8" balsa sheet and accurately cut out. These two pieces (labeled Former "A" & Former "B" on the drawing), when cemented together form a strong and rigid backbone for the fuselage (see Plate 11). The firewall is next cut out of 1/4" waterproof plywood and attached to the backbone with casein or plastic resin glue. Note the notches at the forward end to receive the firewall.

When firewall is set in place and dry, make necessary cutouts for control plate and landing gear attachment in Former "A". Secure landing gear to back of firewall with bolts, nuts and lock washers. Cover nuts with cement after tightening to prevent them from vibrating loose.

Formers are next put in; the empennage (fin, rudder and stabilizer) is completed, elevator is hinged with strips of cloth. The conventional type of control lever operates the elevator. This control lever must be offset to one side so that it misses former "A" and the tie-rod is free to move inside the fuselage. The control plate is installed with its fulcrum located at a point 40% back from the wing L.E. The tie-rod is connected, stringers put in place and the fuselage completed.

The wing is very strong and solid; the way it is shown on the drawing calls for somewhat unusually heavy leading and trailing edges. Try to preserve an accurate wing profile by making templates of cardboard to fit both T. E. & L. E.

Before the wing is covered with 1/32" sheet, the 1/2" dihedral should be made by

creasing the L. E. & T. E. at the wing center and cracking to the required amount—cover the cracks liberally with cement.

Carve and hollow out the battery box, make sure it follows the fuselage contour and fits on top of the wing snugly. The battery fairings and the electrical connections need no explanations I'm sure.

Make a cowl (paper and dope laminations on a plastecine form is best), install motor on metal mounts, cover and dope the ship according to preference. (The original "Fury" was Chinese red and aluminum.)

The completed ship is now balanced by locating the coil in a position which brings the C.G. to a point 40% of the chord back from the L. E.

Well! That's all fellows, your "Fury" is ready for a test flight. Before signing off, however, Mr. Mac, who has been looking over my shoulder uttering insulting remarks, has indicated that he wants to add a P. S.

• •

P. S. . . . The writer of the above imagines that he's done his job. Far from it! Even if you did manage to unravel the grim instructions, and have actually completed a workmanlike "Fury," the most important part of the ship has been coyly ignored: the aircrew of course!

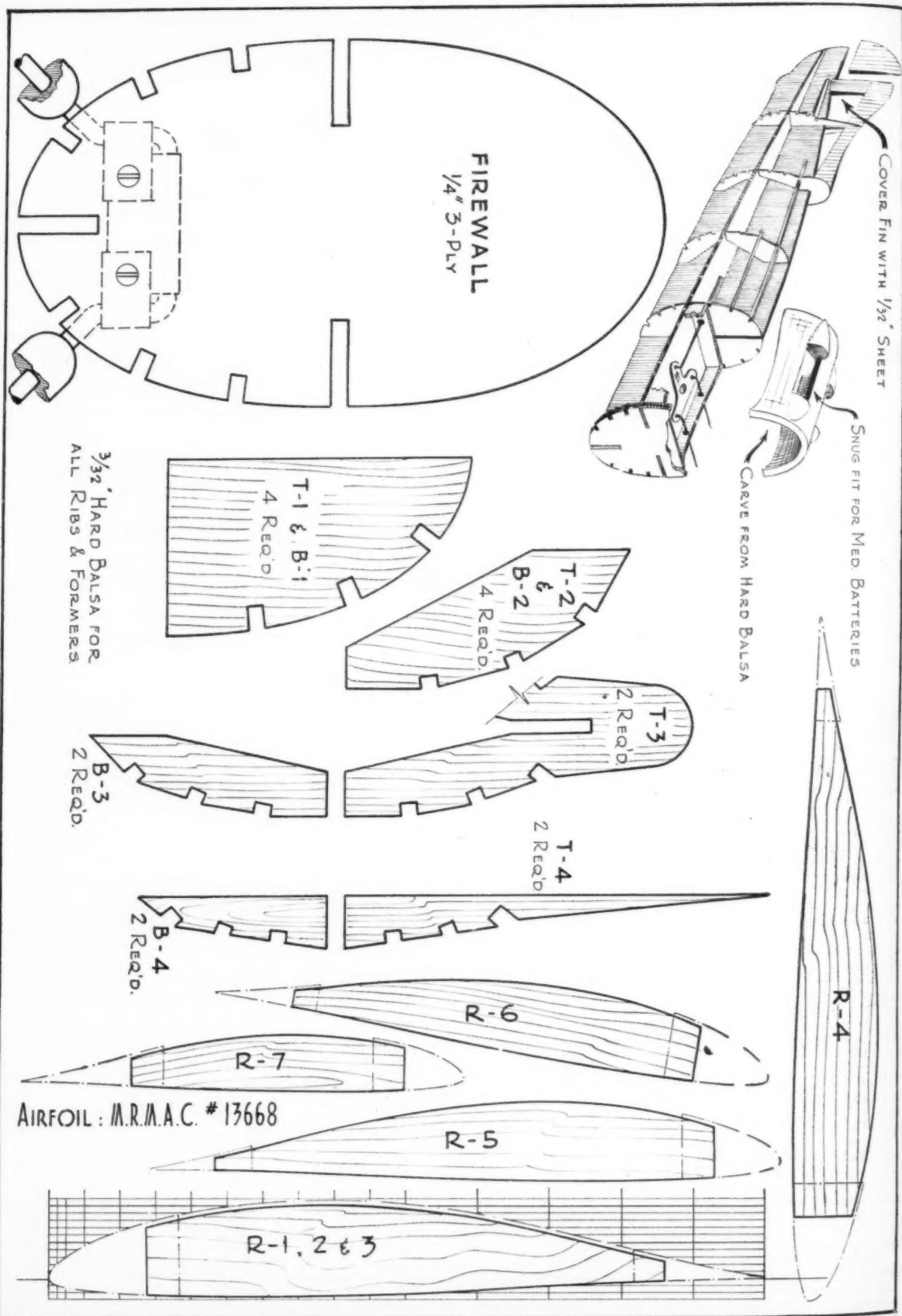
The "Fury" should be equipped with a prop designed to fly the ship at 50 mph. at 5,000 rpm. This speed is obtainable with an Ohlsson 23 but is more certain with a slightly larger motor.

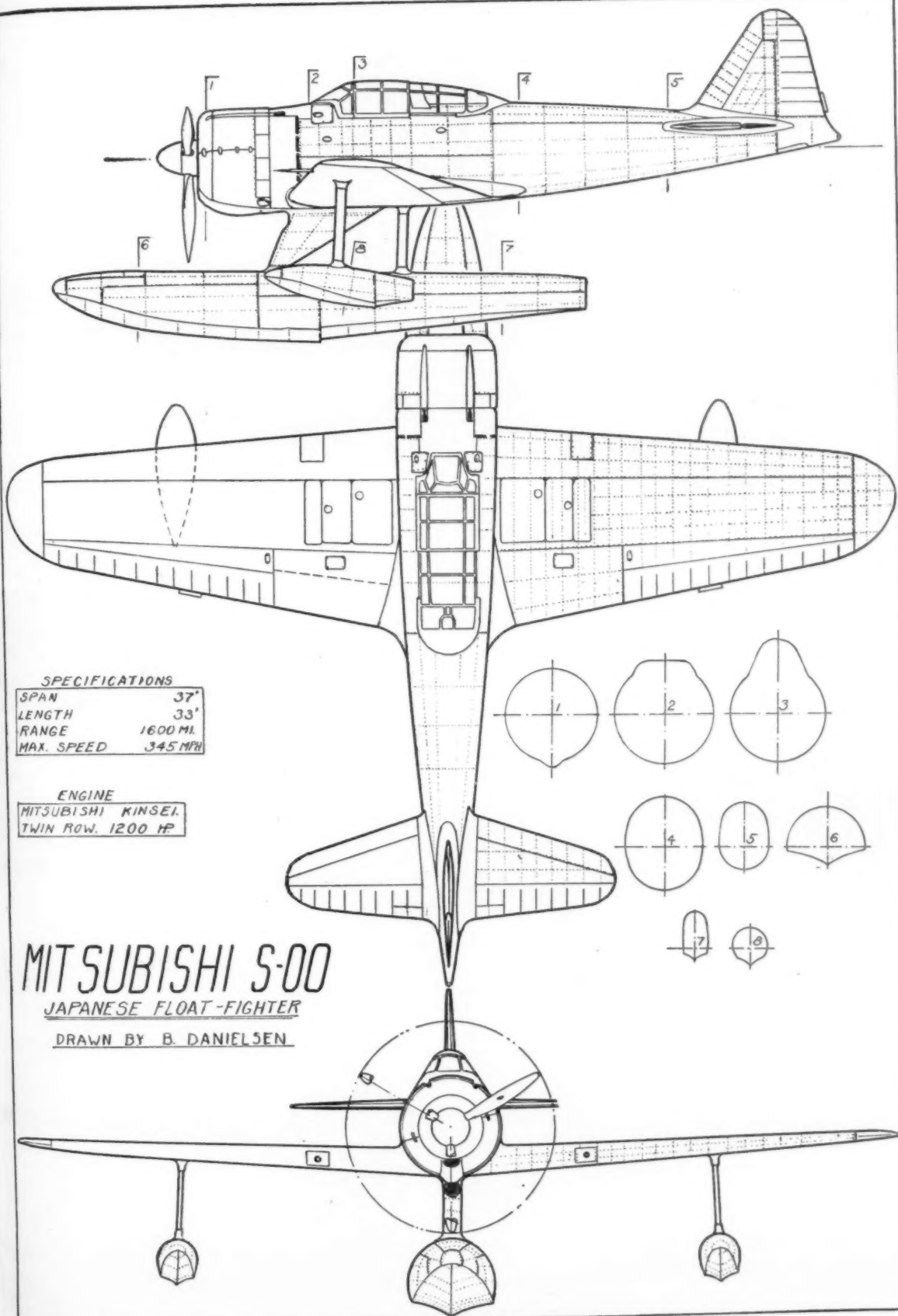
The original model wasn't equipped with a really hot motor so its maximum performance is unknown and never will be as the old "Fury," in view of its particularly hard life, is entitled to rest on top of Luck's piano for the rest of its days.

Luck wanted to include some photographs of the model, but I put my foot down—the poor old ship has become so battle-scarred it has lost much of its original beauty and, consequently, any picture of it as it looks today is really an insult. If you insist on seeing a photograph, there is a small picture of the "Fury" in the January issue of M.A.N. I can and will vouch for the accuracy of Luck's drawings though—the "Fury" looks just like that.—Mr. Mac Gremlin.

VICTORY

It finally actually happened. A paratrooper during training maneuvers at Fort Benning, Ga., leaped out into space squarely in the midst of a thermal. While his buddies landed and started back to the base, our hero hung in mid-air for a half hour suspended by the rising air column. He finally landed but nobody believes him!





SPECIFICATIONS

SPAN	37'
LENGTH	33'
RANGE	1600 MI.
MAX. SPEED	345 MPH

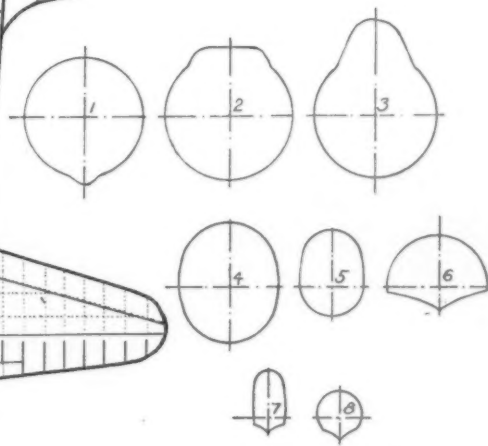
ENGINE

MITSUBISHI KINSEI
TWIN ROW. 1200 HP

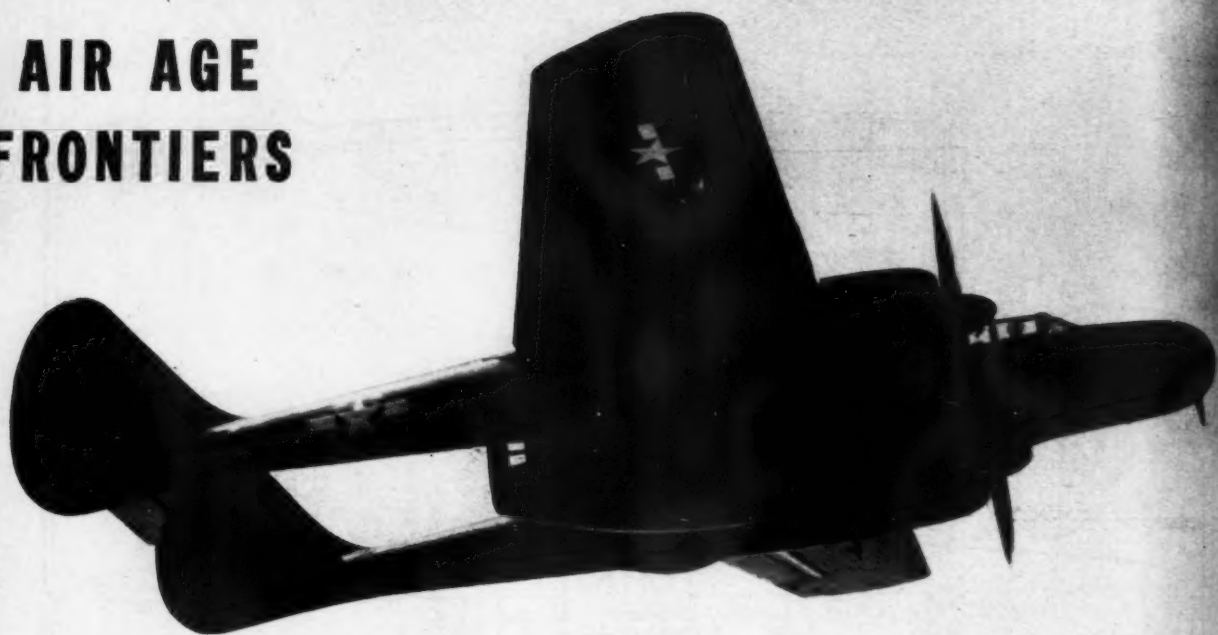
MITSUBISHI S-00

JAPANESE FLOAT-FIGHTER

DRAWN BY B. DANIELSEN



AIR AGE FRONTIERS



Here are first photographs released of deadly Northrop P-61 *Black Widow* night fighter. Most details are still restricted by AAF



A close-up of the *Black Widow* reveals its bomber-like size and smoothly tapered fuselage housing three-man fighting crew



Nose view of the Northrop P-61 indicates power of two Pratt & Whitney *Double Wasp* engines driving huge four-blade propellers



SUPERFORTRESS!

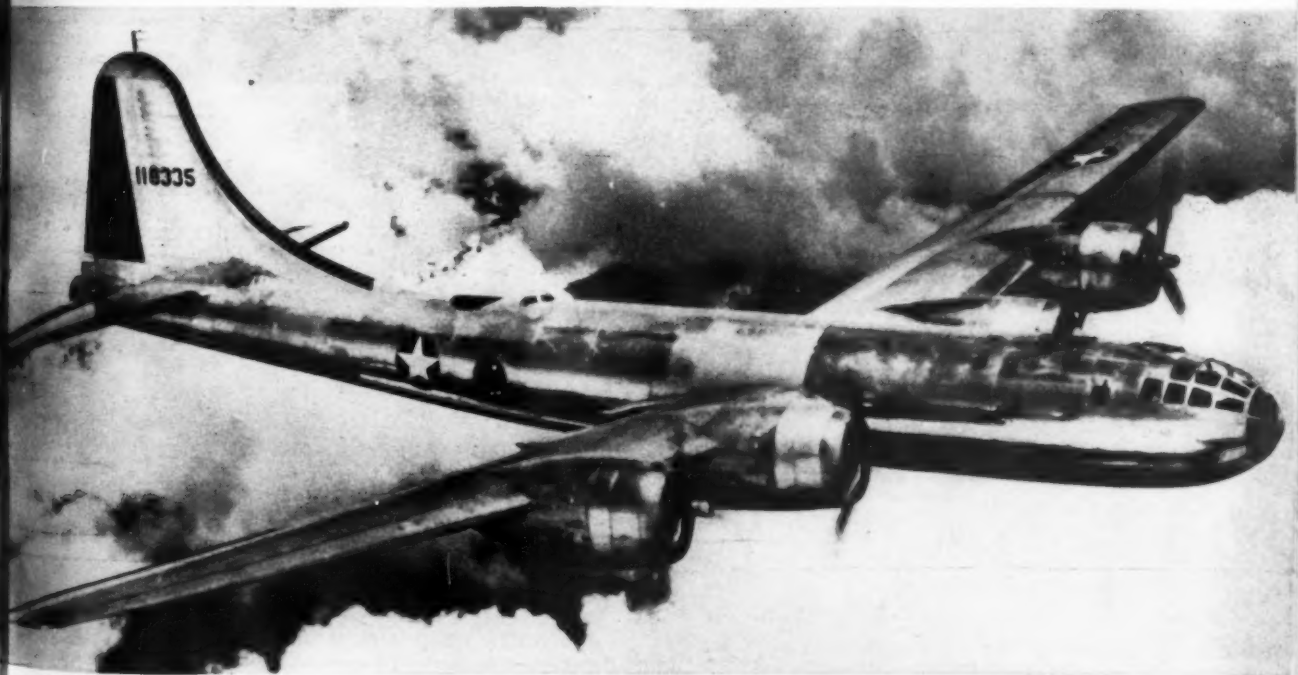
FIRST details of America's vaunted super-bomber, the Boeing B-29 *Superfortress*, together with information on the tremendous country-wide manufacturing program which is speeding its output and the thrilling history of the plane's development, have been released.

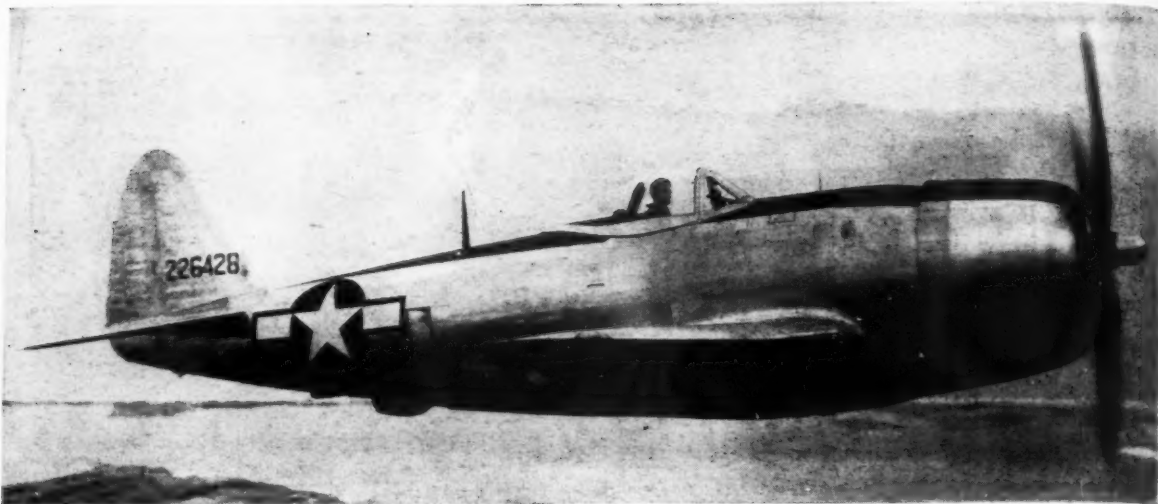
The *Superfortress* is half again as big as the Boeing *Flying Fortress*, while its engines are nearly twice as powerful. It has a wing span of more than 141 feet, is nearly 100 feet long and has an overall height of more than 27 feet.

The B-29 carries a much larger bomb load, has longer range, higher speed and greater service altitude than any other bomber in the world.

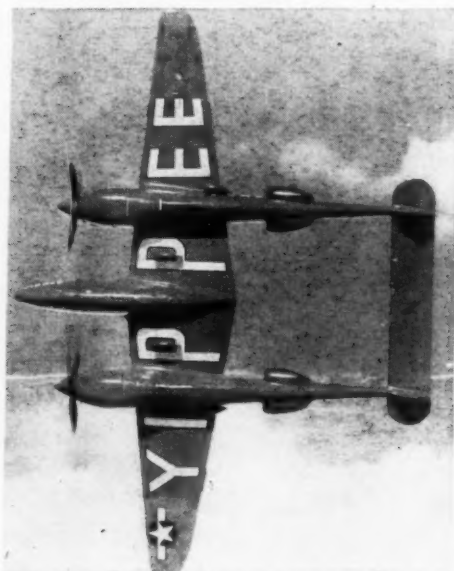
The B-29 is long and cylindrical in shape, with slender tapering wings. The

(Continued on page 42)





Latest warplane in the skies is the Republic P-47 *Thunderbolt* stratosphere fighter plane sporting its new formed plastic enclosure



Lockheed's 5000th P-38 *Lightning* is Yippee!



This Junkers JU-88 mounts a large bore cannon for anti-tank work



First photo of Allied airborne rockets in action. This Bristol *Beaufighter* has just fired a pair. AAF fighters also rocket equipped

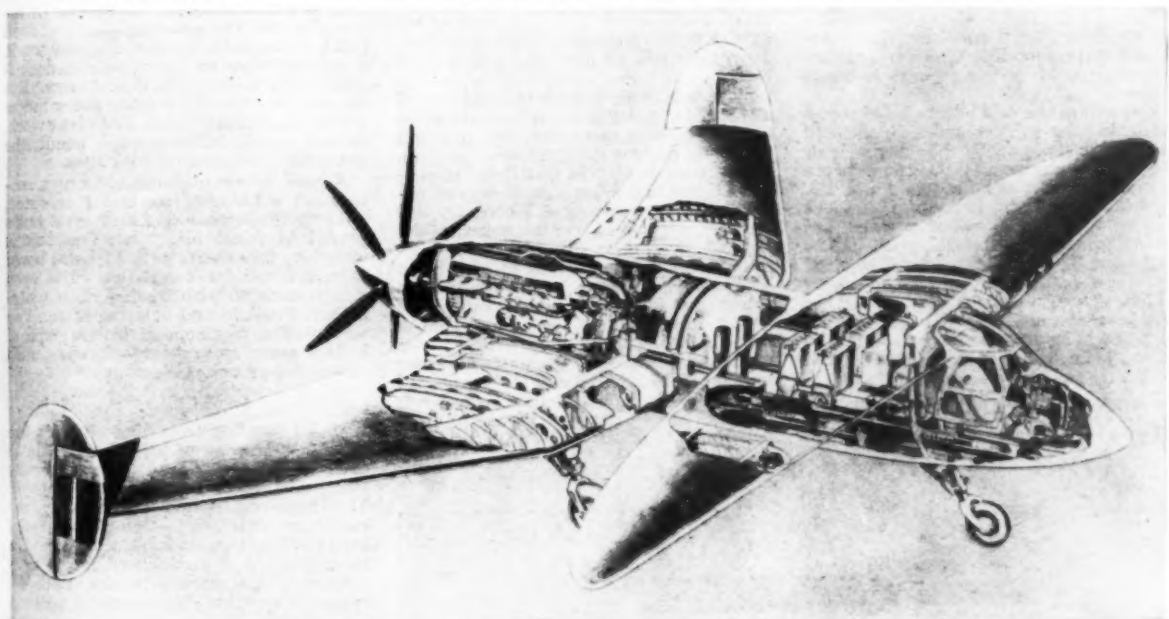
MILES TAILLESS FIGHTER

British designers have not frozen their work as evidenced by the development program on a tailless type by Miles Aircraft.

Ltd. which is also of the canard type. Successful flight tests have been made and research is continuing.



Original flying model is Miles 35 featuring single pusher engine installation and location of horizontal stabilizer atop fuselage



Here is suggested layout of Miles 35 high speed fighter powered by Rolls-Royce *Merlin* and armed with four 20 mm cannon



Latest version is this Miles 39 with twin tractor engines, vertical stabilizer and horizontal stabilizer at bottom of nose



BUILDING a model is a matter of technique acquired only through experience. The best way to learn model building is to build models. Fortunately, however, a knowledge of the rules of construction can be acquired through adequate instructions. *Air Age Model Research* has the fruit of thousands of model building hours in its files, has the knowledge of the top experts in the field and has the details of countless construction problems at its disposal. *Talking Shop* is a new department in *MODEL AIRPLANE NEWS* designed to present this vital construction information in a completely informal manner.

You will not be told how to build model airplanes—the subject will be presented as the experts know it. The beginner or the contest winner may pick and choose such information as he requires and discard the rest. There is no single, correct way of doing a job; one way which has proved practical through the years will be suggested. To the beginner let it be said: "If there is anything discussed about which you want more explanation or additional details, drop a line." To the contest winner: "If there is anything discussed with which you disagree, write telling us *your* way of doing it."

WORK BENCH AND EQUIPMENT

Begin by preparing a place to work and

tools to work with. It is best to have a place you can call your own to work in, even though it is only a small corner of a room. Plenty of successful models have been built on "kitchen table" workshops but it is highly advantageous to have a place in which a partially completed model may be left with reasonable assurance of its being found in good shape upon return. It is annoying and time-taking to have to put away a model after every work session and then have to set up the model, plans, assemblies, cement, dope, tools, etc. all over again, time after time.

If there is space enough to build a good sized table, make it as large as possible because what seems extra area to begin with may become cramped area later on. Extra space is always useful for storing spare wood and other materials; and remember to have plenty of shelves for this purpose, arranging one or more in the form of small, deep pigeonholes about 2" square and at least 3' long to hold balsa strips and drawings, which should be rolled, not folded. A folded drawing is almost impossible to flatten out, but a rolled drawing needs only two or three small weights around the extreme edges to make it lie flat. Several shelves should be made large enough to hold cigar boxes in which small parts, such as wheels, propellers, coils of wire, etc. may be kept.

Several drawers to keep tools not in use should be included; this keeps them clean and available when you want them. (Locks are a matter of discrimination.)

Fig. 1 is a model builder's table containing the features described. Size is not given, the general idea is to make it as large as possible. If the builder is fortunate enough to have a whole room to himself, set aside half of it for the table; it will pay in the long run. Most of us have little choice when it comes to picking a spot in the house for our model workshop but here are a few hints: avoid using an upstairs room or attic, they are usually very hot in the summer and difficult to heat in the winter. The basement presents practically the same problem with the additional hazard of dampness. This is a health risk principally but it also can ruin tools and cause difficulty with covering and doping materials. If the basement is completely dry and well ventilated the year around, this is your spot. Best spot remaining is a room on the main floor which is normally dry, well ventilated, easily heated and cooled.

LIGHTING

Do not arrange your desk with a single light source. The easiest mistake to make is to place a desk lamp with a single, brilliant 200 watt globe in the middle of the work bench. This provides plenty of light but is inefficiently spotted. For day work, a large window to the left of the desk is preferable, to the right if necessary. But do not face the light from the window under any circumstances. For night work, several small bulbs spaced about the work cut shadows to a minimum.

A good light is made by building a rectangular box 2' or 3' long and 8" on a side, with three or more 25 or 40 watt bulbs placed at equal intervals. The box is closed on three sides with 1" holes bored in either end for ventilation. The open side is covered with tracing cloth which softens the light and cuts the glare. You will particularly appreciate this type of light if you plan to do any drawing, such as tracing or enlarging plans.

TOOLS

Model building tools, like all tools, are largely a question of private selection as each builder uses the tools he personally feels suits the job and his way of doing it. The beginner should obtain only the minimum tools required for commercial kit building; these normally consist of a razor blade and sandpaper. As he progresses in the science he automatically acquires more tools necessary to perform more complex work. There are many handy tools highly useful for building simple commercial kits, tools that turn out a vastly improved job. And for the expert builder there are tools that eliminate considerable time-taking work, do a superior job and produce more accurate results.

The basic tool for all model work is a sharp balsa cutting tool. And this brings up the subject of razor blades. Regardless of what is said here, the beginner invariably starts his first construction job with an old fashioned razor blade. Razor blades can be used for model building by those who must. With the double edge type, break in half lengthwise and fold a strip of adhesive tape along the broken edge to furnish a grip and to protect the fingers. If you must use a razor blade, insist on the single edge type as this has a firm backbone, is easy to grasp and fairly fool-proof. A small razor blade holder costs about 15c at the dime store or one may be built very easily as shown in Fig. 3.

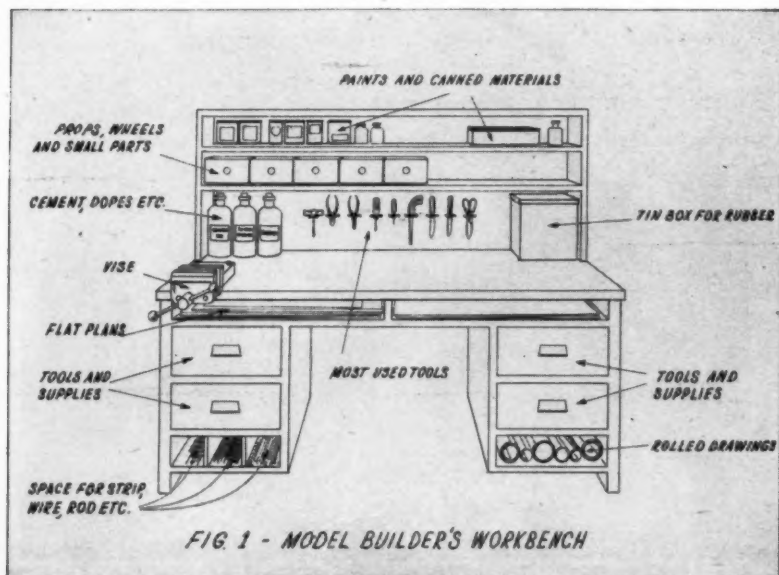


FIG. 1 - MODEL BUILDER'S WORKBENCH

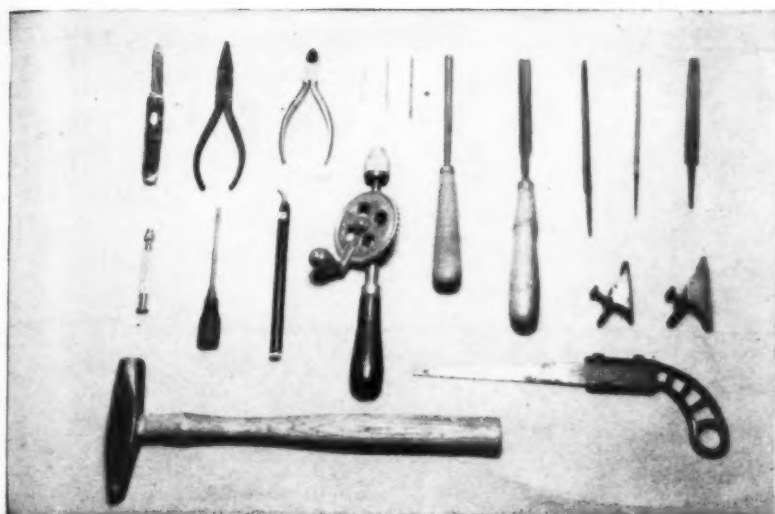


Fig. 2. Here is a selection of the most useful tools needed for model building

But the most useful tool in model work is the standard model knife available at any model or cutlery store. This knife has a long, cylindrical handle and an interchangeable blade feature which makes it ideal. The knife with blades is sold in small kit form at various prices varying with the number of blades and holders desired. It is best to purchase the large set because it is the most useful tool in your shop and you will find it well worth the very moderate cost involved.

Sandpaper is the next essential, and here again a good investment should be made in a large selection with many sheets of each grade. The better the model builder the more sanding he does on his model, so get used to the idea of sandpaper, having it and using it. Don't stock up on the rougher grades, finer grades do a better job though it takes a little longer. The rough grades are useful in making the preliminary smoothing on cowl blocks, solid scale model fuselages and wings and on hardwood structures, but the finer grades are used most of the time. Sandpaper should be wrapped around a block 1" x 2" x 5".

For very close work, cut a block about 1/2" square by 3" long. The sandpaper, wrapped around the block, can be held in place by the forefinger or cemented to the block as a more permanent tool. Do not attach it by thumb tacks or straight pins because you invariably pick it up the wrong way and sooner or later dig a very neat gouge straight across the assembly. A word of warning about flat files for shaping balsa: don't! Many modelers use extremely fine files successfully, but ultimately a mistake is made and that part must be started all over again. Files are usually two-handed propositions and vises are rather hard on models. The slip of a sandpaper block across the palm of the hand never hurt anybody, but a slip of a file can be painful.

A straight edge is next on the list, not a ruler; and remember there's a big difference. A scale is something else again. A scale is a graduated stick used for only one purpose: measuring. A pencil dot is placed on the paper at the proper point and the scale is laid aside. A ruler is a combination scale and straight edge for drawing lines in addition to making measurements. But a straight edge is for one purpose only: cutting, and should be

used for no other. Any good brass-edged ruler, obtainable at a dime store, is useful as a straight edge and the 18" size is preferable; but make up your mind from the start that it is to serve as a straight edge and nothing else. After stripping balsa with a ruler, small nicks in the brass edge are unavoidable and these play hob when drawing a very accurate pencil line. For drawing lines and making rough measurements, buy a separate ruler for no other purpose. And if you intend to scale up drawings, make your own drawings, or make changes on an existing drawing, buy a scale. This is a triangular length with various scales on each of the six edges. Again, never use a scale as a straight-edge.

Figure 2 shows a good assortment of the basic tools. A pair of long nose pliers and a No. 60 drill with holder may be considered part of the basic tools. To this list may be added an infinite variety of special tools some of which will be mentioned. A pair of so-called diagonal cutting pliers are almost indispensable. Get the best grade possible because tough piano wire easily ruins a cheap one. A small cabinetmaker's plane is useful for smoothing down small hardwood and bamboo pieces, obtained with either a flat or round bottom. Both of these surfaces are useful but the flat type performs the greater service. The round bottom is for cupping propeller blades, smoothing the inside of hollowed-out balsa fuselages, etc.

For hollowing out balsa blocks, gouge chisels are needed, available either singly or in sets. If much balsa hollowing is contemplated (U-control designs feature this), the sets have more utility, coming

(Turn to page 36)

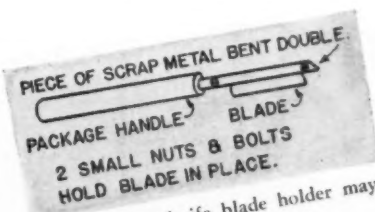
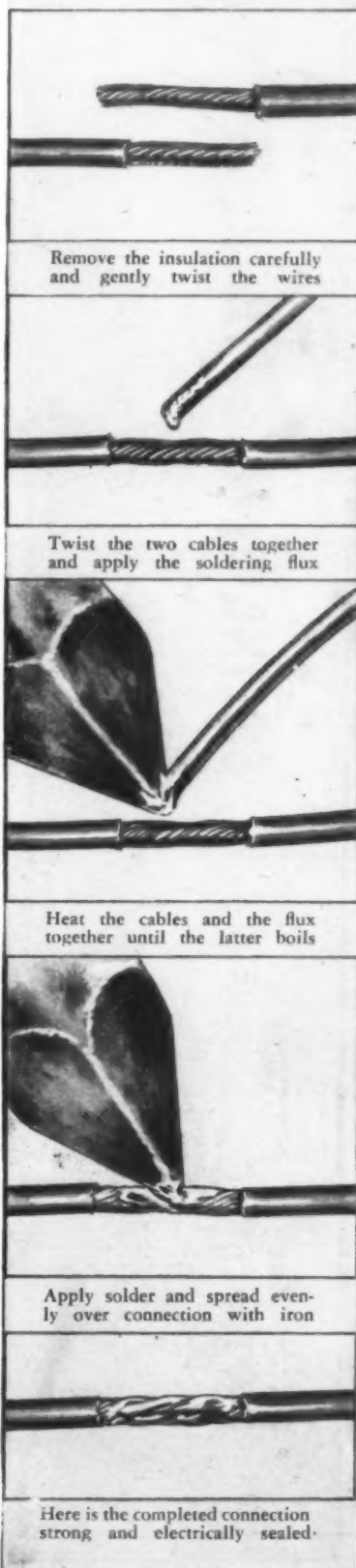
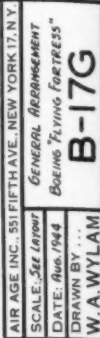


Fig. 3. A simple knife blade holder may be made using scrap parts

Fig. 4
SOLDERING TECHNIQUE



Backbone of American Air Power



Story of the **FLYING FORTRESS**



Plane on the cover

NOW over Berlin, thrusting at the heart of the Reich, is the *Flying Fortress*, leading the assault in what is regarded as the most decisive military campaign of World War II. It is the massive *Fortress*, product of the long-range vision and inventive courage of the Boeing Aircraft Company, that is making possible this important phase of Allied strategy in Europe.

Precision bombing from the stratosphere, mighty asset of the *Fortress*, is making possible the aerial all-out smash. Now with the Allied world watching the test of strategic bombing to soften and crush Germany, the *Forts* are flying and fighting, in the words of General Arnold, as "the guts and backbone of our aerial offensive."

And behind the intrepid pilots, the fearless gunners, the grim-lipped bombardiers are countless engineers, thousands
(Turn to page 21)



Granddaddy of the *Flying Fortress* is this Y1B-9A built in 1931



Here's the first Boeing *Flying Fortress*, the Model 299 which first flew in Seattle on July 28, 1935 with Les Tower at controls.





Boeing YB-17 (left) was first quantity service test order. B17B (right) featured new nose and turbo installation

upon thousands of workers whose genius, skill and sweat have produced this toughest offensive weapon of them all. For 28 years the Boeing Aircraft Company pioneered in aviation, perfecting new developments, introducing revolutionary airplanes until the *Flying Fortress*, fruit of the years, was ready to rain destruction on the enemies of America.

The story of the Boeing Company has all the romance, courage and heartbreak of aviation itself. It starts almost with the first beginnings of aviation when a small group of men, led by resourceful William E. Boeing, started an "aeroplane" shop on the shores of Seattle's Lake Union. Ostensibly it was for the purpose of repairing a damaged seaplane, but the enterprising group also had a hunch they could build a successful new airplane themselves and perhaps become contractors to the United States Government in its armament program.

How far this early group's first dreams succeeded 28 years later now comprises some of the most triumphant pages of America's war record today. *Fortresses* hurled bombs from Luzon to Libya and from Hamburg to Hanoi. The *Fort*s of the Eighth Air Force have penetrated deep into the Reich and now, say Allied leaders, are able to attack successfully targets in the Berlin area without being turned back. Such long-range offensive bombing is the result of years of patient but daring experimentation in every related field of aerodynamics by the Boeing Company.

That first "aeroplane" factory in Seattle began in 1916 with an inventory of a few rolls of fine steel wire pegged to the wall, some racks of carefully selected straight-grain spruce, and some linen, for the first Boeing plane, the B & W trainer, a seaplane.

This first ship was successful, as were the second and third. In three years the virile young company turned out 78 training planes for the Navy. Boeing production was under way.

An excess of airplanes after the first World War caused orders to dwindle. The company turned its wood-working crews to building bedroom furniture and sea sleds but its engineering staff planned and studied for the future. Before long,

(Turn to page 45)



Flying Fortress B-17C was produced for Royal Air Force and saw action



Boeing B-17D had self-sealing tanks, armor plate incorporating war lessons

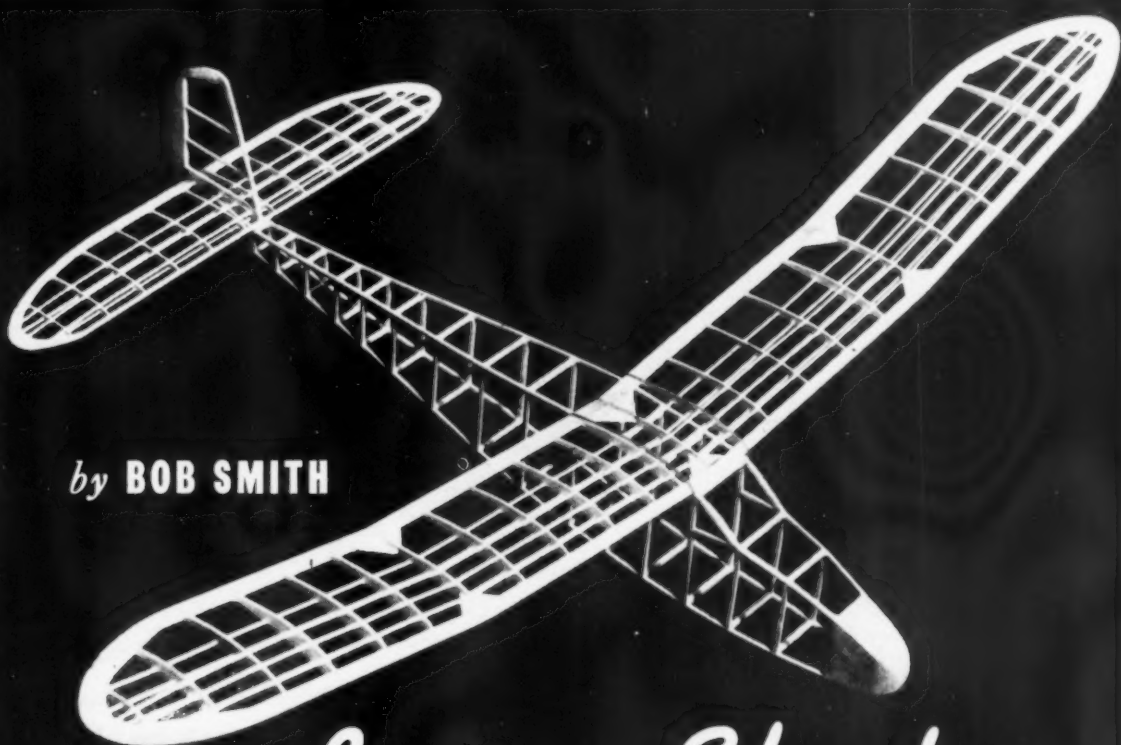


New tail gun position went into B-17E and mass production was started



B-17F has new nose, greater bomb load. Latest *Flying Fortress*, B-17G, has chin turret, is smashing enemy on every front





by **BOB SMITH**

Jersey Skeeter

SINCE Pearl Harbor, the supplies of gasoline and rubber have become increasingly acute. Towline gliders have taken the spotlight in the last contest season because they require none of these scarce items.

Gliding is man's nearest imitation of the birds. What a thrill it is to see your model suddenly rising in the grasp of a thermal, and circle high in the sky in effortless flight!

The *Jersey Skeeter* demonstrated itself as a real thermal rider. It has placed in many contests during the past season, including first place at the Perth Amboy Rubber Meet with a three flight average of 1 min. 20 sec. It also set a new Linden Model Aircraft Club record with a single flight of 5 min. 16 sec. The longest unofficial flight was 7 min. 30 sec., which was the ship's last flight since it never returned.

CONSTRUCTION—Before actual construction is begun, full size plans must be drawn. This is not a hard job because the plans are drawn to scale.

FUSELAGE—The fuselage is begun by pinning the longerons of hard 1/8" square balsa into place. Do not push the pins through the wood but place them on each side so the longerons are not weakened. Add the uprights next, using care to make good, well fitting joints. To assure accuracy, build the other side directly on top of the first and, when dry, separate with a razor blade. The sides are then joined, first at the tail and then at the nose.

(Turn to page 38)

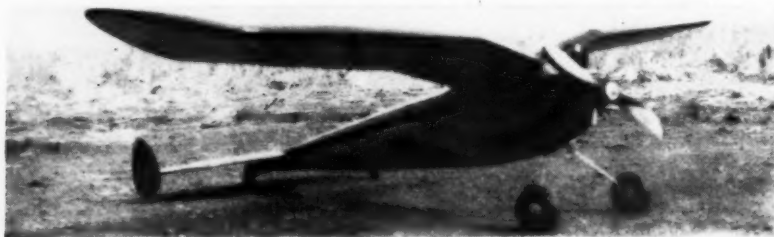
Here's a thoroughly tested and proved Class C tow-line glider that is a sure contest winner. I. Greg Higgins design perfected by Bob Smith



AIR WAYS



No. 1 A Republic *Thunderbolt* model by H. C. Meyer that illustrates how good photography can enhance the beauty of a fine model



No. 2 Careful design went into this original gas job by Bernard Simons



No. 3 A Bristol *Beaufighter* model built by R. Greeves way down in Australia



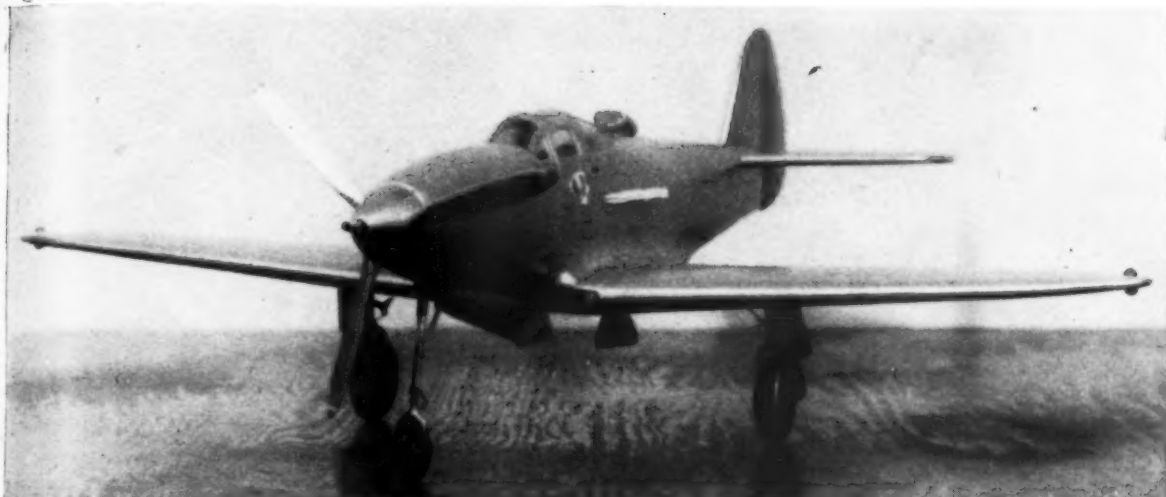
No. 4 An outstanding job of detail has been done on this Stinson *Reliant* control-liner by Bob Evans. Landing lights operate

News of model plane experimenters from all parts of the world

MOST of the commentaries we read concerning post-war planning think in terms of peaceful post-war living in which the shadow of militarism, conquest, aggression and preparedness never darkens the horizon. The experts who predict a war-free world for the next thousand or even hundred years are likely to be making a very vital mistake. From a study of our very late history it appears that this scourge besets us about every quarter century and there is the possibility of yet another war just 25 years from now, perhaps with one of our present enemies and still just as likely with one of our present allies.

Your Editor has talked (together with other aviation reporters) to many high-ranking Army and Navy officers as well as leading figures in civilian life and the consensus of opinion, ominous as it may sound, seems to be that some form of compulsory military service must be and





No. 5 Elmer Slicker built this fine Bell P-39 *Airacobra* while confined to Bergen Pines Hospital. The landing gear is all metal

will be introduced into the United States in the very near future. This means, simply, that every able bodied youth, with certain exceptions, will be required to serve one year in some branch of the armed forces, probably between his last year of high school and his first year of college.

Of course this "service" will consist largely of a training program and will be operated similar to one of the popular R.O.T.C., C.M.T.C., or even private sum-

(Turn to page 27)



No. 6 A fine flying model Grumman *Skyrocket* by Jose Urteaga of Chile



No. 7 H. B. Leibman tells of South Africa.



No. 8 Nelson D. Wight, Jr. and another fine scale job, this Bell *Airacobra*



No. 9 A collection of miniatures by H. W. Arnold. Included is a *Liberator*, *Airacobra*, *Warhawk* and *Catalina* solid scale



ROCHESTER GROOMS ENTRY

THE semi-annual gas contest of the *Los Angeles Aero Modelers, Inc.* scheduled for June 25th, 1944, may be the scene of a new world's speed record for control line jobs if Rochester, Jack Benny's radio comedian, has anything to say about it. He recently conferred with Boeing aerodynamicists on critical points concerning his entry. Above Rochester gets a few pointers from Jack Harshman who explained the propeller was the important problem. Below Harshman, Bruce Alfson and Phil Dickert figure out best prop for 15,000 rpm $\frac{1}{2}$ hp model engine. At right Rochester gets wind tunnel test figures indicating 125 mph record.



mer camps. There will be numerous courses of instruction both academic and physical and upon completion of the year the student will be returned to his private life properly certified as a reserve member of the specific branch in which he has been trained.

A very large portion of this training program, regardless of the branch of service, will be aviation training. And at least the early stages of this training will be concerned with model building. Model building, too, may soon be a part of the grade and high school curriculum and, in fact, already is a part of the manual training elective in many, many schools.

The point of all this is simply that model airplane design, construction and flying is rapidly graduating from the hobby classification into the educational realm and this process is precisely what MODEL AIRPLANE NEWS editors through the years have been advocating and working towards.

We can think of no better way to learn aviation than by model building. It teaches fundamental aerodynamics, the basis of all flight, and provides a basic background so thorough and so genuine that perhaps no other method of instruction can compare with it favorably. When a young man has designed, built and flown his own model airplane, tested it thoroughly, corrected all its faults and perfected it into a completely reliable airplane, he has learned more about aviation in the process than twice the number of hours spent in a lecture hall, perhaps a dozen times!

Today's modelers have a challenging opportunity before them in this instruction program and we must make it known that we are not only willing but anxious to take a vital part in the program. The public schools are becoming increasingly aware of the enormous possibilities for simple, fundamental learning of a highly complex science provided by model building. Classes are being formed and instructors are being trained. But there is a vast reservoir of such instructors in the model youth of America, men who are prepared to show the way to coming generations born into the AIR AGE.

Why not drop into the local office of the Department of Education or the Board of Education of your city and talk it over with their representatives? They need your help, we need your help and your country needs your help!

Picture No. 1 at the head of *Air Ways* this month represents, again, the perfect blend of good model building and good photography, a combination which cannot be beat. The Republic P-47 Thunderbolt model is the work of H. C. Meyer, 1450 Adams, Denver 6, Colorado. About it he says: "I have been working on this model only in my spare time and, although I've been at it since January 15th, I don't feel that it's complete. It is built from a flying model kit but I put a 'skin' of sheet balsa on the whole airplane, control surfaces and all. The controls are movable from the cockpit, the landing gear retracts and the cockpit cover is movable. It is equipped with flaps. It is not entirely complete and I plan to detail the cockpit, finish the landing gear and make the tail wheel retractable."

He modestly lets us in on the secret of the beautiful photo, however, by saying: "The photograph was taken by C.A.A. Resident Flight Supervisor Hal C. Blackstin and his excellent photograph flatters the plane. This picture has fooled nearly everybody that has seen it, so most of the credit goes to him."

(Confidentially, your Editor had to look

twice to be sure it was a model!)

"The picture was taken on the apron in front of the hangar at Hayden Field, which accounts for its realism."

Mr. Meyer has hit *Air Ways'* high standard on the nose and you fellows will have to go a long way to beat this job.

Picture No. 2 comes from Bernard Simons and hardly does a fine model justice. Bernard, who can be reached at Box 381, Edgemont, South Dakota, writes: "This model is the product of over a year of designing and building. It is powered by an Ohlsson '23' and embodies one of the most stable force arrangements. Since entering the gas model field about four years ago my main interest has been in the design and construction of more efficient and practical gas models. These models range from low-wings, that look like a Douglas *Dauntless* to modified pylon jobs.

"The gull-wing model pictured has proved on recent flights its amazing stability as well as a beautiful soaring glide. On its second flight with considerable power and out of adjustment it circled very tightly to the right but, instead of piling in, it climbed slowly with only a slight banking tendency. It has no tendency to stall when the power cuts off. I attribute this to the low C.L.A. and fin area with a high thrust line.

"Designed for post-war competition and with an eye to knocking out the pylons. The gull-wing does much by increasing efficiency and stability. This

MODELERS!

Are you interested in what the other fellow is doing? Well, he's just as interested in what you're doing! So why not send news of your experiments to *Air Ways*? Send us several clear, glossy prints of your latest flying or solid model and a note giving all the details and we'll do the rest. And don't you Club Secretaries forget us either!—Editor.

model actually has a higher lift than many pylons. It is my opinion that to transfer the parasite drag of the pylon into useful lift increases flight capacity.

"The model has a span of 51 inches, over-all length of 34 $\frac{3}{4}$ inches, wing area of 321 sq. in., stabilizer area of 91 $\frac{1}{2}$ sq. in. and the airfoil is a Grant 'X.' The trailing edge of the wing is straight and the leading edge is elliptical with an aspect ratio of 8.

"It has all balsa crutch type construction and the wing cabin is removable allowing easy access to batteries, wiring and motor. One feature which allows the wing to be moved forward is a small hole in the windshield through which the motor may be choked."

There is a very complete description of a model, we'd say, giving not only the details but the basic idea behind the design.

Bernard passes along a helpful hint to anyone who may care to use it: "One timely tip which I think many modelers will appreciate is a method of fixing leaking and punctured airwheels. Inject about tablespoon or more (depending on wheel size) of skimmed sweet milk and then inflate the wheel. Leave the milk in for three days, rotating the wheel occasionally. Many motorists use this method when cactus punctures their automobile tires."

Thanks a lot for that tip, Bernard and

send more of 'em along when you think of them.

Picture No. 3 has come a long way to *Air Ways* since its owner lives in Australia. It is a beautiful Bristol *Beaufighter* built by R. Greeves, 9 Gilbert St., Coburg, Victoria, Australia. In his letter he says: "I see that you have pictures in *Air Ways* from Australia several times and wondered if you would like this one of my *Beaufighter*. It is a solid and I have won a prize with it at a model contest held in aid of the Merchant Navy." There's a swell idea, fellows! Why not charge admission to your next meet and turn the proceeds over to a relief agency of the armed forces? The meet should be advertised in advance in order that many people might come merely as a contribution to the war effort. These aside from those who attend because of model interest.

Greeves continues: "I am a member of the West Preston Modelplane Club. We were making rubber jobs nearly 2 years ago when rubber began getting so scarce we decided to start making gas models. We have about 8 models in the club and the highest time so far has been 30 minutes. (Australian modelers do not use timed motor runs—Editor.) We use Forster, Brownie and two Australian motors but the latter are not nearly as good as your American motors. We hope to have plenty of American motors out here after the war.

"There are not many modelers left here anymore, most of them having gone into the R.A.A.F. They all say that model building has been a great help to them. I hope to go in soon."

Picture No. 4 shows one of the most amazing models of which we have ever heard. It is a Stinson SR-10, circa 1938, built by Robert Evans, 8 Byron Avenue, Kenmore 17, New York. Of it, he says: "The model has the following specifications: span, 82 $\frac{1}{2}$ in., length, 42 $\frac{3}{4}$ in., wing area, 816 sq. in., weight, 8 lbs., power plant, Ohlsson '60' and the scale is 2 in. equal 1 foot. The model is a U-control and is the result of a desire to build a detailed scale model with good flight characteristics. The model has navigation lights which operate off six pen-cells mounted inside the cabin. The batteries slide on a track to aid in balancing. Lights are easily replaced as the light covers (made of spring brass and celluloid) simply snap in place. Landing lights are built into the wings and are turned on while the ship is in the air by means of a third line. Thirty seconds after the landing lights go on the motor automatically cuts off and the ship lands realistically.

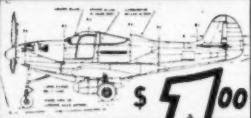
"Thirty-five feet of wire connects lights, ignition, etc. The landing gear has rubber shock absorbers which are quite effective. The tail wheel also has shock absorbers and swivels a full 360°. A 4 oz. auxiliary gas tank is built into the nose which enables longer flights and less refueling. The cabin door opens for access to batteries, shock absorbers, light switch, control line mechanism, etc. The door handle has a spring catch which locks the door. The cowl is hinged and the upper half unlocks and swings back. The cowl is completely removed by pressing a spring catch. Wings are removable for transportation. Rudder and ailerons are adjustable if the need arises. The model is painted blue and cream with a black pin stripe. The finish is rubbed and waxed. Although much slower than the conventional (or unconventional—Ed.) control line job and slightly underpowered for its weight, the Stinson is excep-

(Turn to page 54)

WORK WITH WORLD'S FINEST PLANS

TO BUILD SUPER-DETAILED

(7) FIGHTERS
(7) BOMBERS
(5) CONTROL LINE



\$1.00

Custom-Tailored "Nose-to-Tail"
Every Detail in Faultless Scale!
The ONLY draftsmanship of its kind! Each plane actually cross-sectioned and skeletonized! Hairline precision! All parts full size! Technical features, armament, controls, landing gear, auxiliary tanks, rivet detail included! Photos and description.

- | | | |
|---|--|---|
| #1—FIGHTERS | #2—FIGHTERS | Any 1 Plan 1/4" Scale 15c |
| 51—Hawker Typhoon
52—Vought Corsair
53—Spitfire IX
54—Focke-Wulf 190A
55—Lightning
56—Curtiss P-40F
57—Mosquito | 58—Grumman Hellcat
59—Mitsubishi Ziv
60—Sukhoi Su-26
61—Thunderbolt
62—Mustang
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The Bird and the Crown

(Continued from page 7)

a large fighter school in Ayrshire, Scotland, there was a joke among them that as there was only one Stars and Stripes at the school, coffins would have to wait their turn so that the flag could be used on each individual case. Years later, in 1939, when I was Chief Instructor at a large school, also in Scotland, in three years' operation at the E.F.T.S. we had only one casualty. Two reasons for the colossal difference are: aircraft and their engines; and secondly, but by far the largest contribution, the actual method of training.

To return to Trenchard, it was common knowledge among us pilots that 'Boom' would return to England from France and personally fly a new type of machine before it went overseas for us to fly in combat, thereby giving us a feeling of security which was so badly needed in 1916 and 1917 when Germans brought out their Halberstadts and Albatrosses.

In 1918 when the Royal Air Force was formed, 'Boom' was given command of a bombing section, christened the Independent Air Force; and when the Armistice was signed in November of that year he was ready to bomb Berlin with Handley Pages.

It is typical of present day high ranking officers of the Air Force that they themselves, although no longer flying combat duty, know what it is all about. Two outstanding examples of this are Air Marshal Sir Arthur Tedder and Air Vice Marshal Sir Arthur Coningham. Both joined the Royal Flying Corps in 1916, and the letters Coningham is entitled to use after his name prove his individual heroism: K.C.B., D.S.O., M.C., D.F.C., A.F.C.

His nickname of 'Mary' is not effeminate as some people seem to imagine. He was born in Australia but was taken to New Zealand a few months later. The natives of New Zealand are the warlike Maoris, so when he joined the R.F.C. he was nicknamed 'Maori' Coningham, which very shortly became 'Mary'. When World War I broke, he enlisted in the Canterbury Mounted Rifles as a trooper and served with the Anzacs at Gallipoli in 1915 where he contracted dysentery and was invalided home and discharged as no longer physically fit for active service. Disgusted with that, he paid his own passage to England in 1916 and obtained a commission as 2nd Lieutenant with the R.F.C. His record as a fighter pilot flying Camels and S.E.5's was brilliant. The incident for which he won his D.S.O. will demonstrate why all pilots treat 'Mary' with respect.

He was returning alone from a combat patrol, after he had become separated from the rest of his flight, when he saw five enemy Fokkers below him about to ground-straft one of our artillery observation Squadrons comprised of D.H.4's at their airdrome to the west of Arras. Nearly out of ammunition he dived to the attack, sending two crashing down, and although he was outnumbered three to one they broke off the engagement and headed for home.

When the war was over he decided to make the Royal Air Force his career and obtained a permanent commission. Now, Great Britain with her possessions and protectorates all over the world has continuously, throughout the so-called 'peace' years, been quelling uprisings and rebellions throughout the world,

and in 1923 'Mary' again saw active duty in the Kurdistan campaign.

It has been assumed by many people that the R.A.F. was taking unfair advantage in bombing tribes who had no anti-aircraft protection; but flying over the desolate and almost impassable mountainous regions was a hazard in itself, for in those days engines had a habit of conking out, and woe betide any pilot who force-landed in hostile territory because he would invariably be mutilated before being put to death. It was found effective to use two squadrons of Royal Air Force in place of perhaps as much as three divisions of infantry for a punitive expedition.

In 1925 'Mary', who was then a squadron leader, led a flight consisting of three D.H.9A's fitted with Liberty motors, 5,600 miles across the Libyan Desert, the Chad territory, and Kano in northern Nigeria, which was the longest flight to that date and amounted to twice an Atlantic crossing. For that feat he was awarded the A.F.C. He took Staff courses at Sheerness and Cranwell, finishing up at the Central Flying School, and showed that he not only had bravery but brains as well. And so in September of 1939 when Great Britain went to war with Germany he was the Air Officer commanding No. 4 Fighter Group. Then when the African campaign started he was sent out to Africa as right hand man to Tedder who was General Officer commanding the R.A.F. who chased Rommel out of Libya into Tunisia.

Twenty-six years elapsed before 'Mary' Coningham and 'Scotty' Tedder, with a wealth of experience behind them, joined forces. To those of us who know them intimately, their outlook on life is very similar; but whereas 'Mary' had collected decorations in World War I, 'Scotty' through no fault of his own always seemed to miss the boat. A reliable, courageous pilot in the 32nd Artillery Observation Squadron, on three separate occasions he was mentioned in dispatches, but his Commanding Officers' recommendations for decorations somehow seemed to miss fire.

In August 1914 'Scotty' Tedder was in the Fiji Islands, but like so many young men in the Colonial service he relinquished his job and made tracks for England and was granted a commission in the Dorsetshire Regiment. Then in 1916 when the urgent call went out for volunteers for the Royal Flying Corps he applied for a transfer and was seconded to the R.F.C. I can picture him now, leashed, inclined to be a bit scrawny, as he leaned up against the "trelliswork" of his F.E.2-B when the flight sergeant asked him the routine question, "Any letters, documents, in your possession, sir?"; and with his slow Scotch smile he replied as he patted his pockets, "Nothing doing, Flight."

To the average pilot of the R.F.C. he was classed as brainy, and to illustrate his methodical turn of mind a brief outline of his attitude to aerial warfare will suffice. He very earnestly requested his C.O. that he be appointed gunnery officer of his squadron. At that time the Hun was making a habit of doing hit and run light bombing attacks at night on various airdromes; what is termed in this war "nuisance raids."

(Turn to page 30)

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"Scotty" devised the idea of rigging up six Lewis guns on a platform, all inter-connected, so that when the gunner pressed a central trigger every gun fired, with the operator directing them back-wards and forwards in a semi arc, there-by putting up a form of barrage. To the great amusement of his squadron, Brigadier General Thomson, commanding the 65th Brigade, visited the 32nd and inquired what was aided by the platform on which the Lewis guns were mounted. It is a well known fact that what goes up must come down, and to "Scotty's" dis-comfiture and chagrin amidst the ribald laughter of his brother pilots, it was testily and tersely communicated to him that his barrage of 303 bullets were not only missing the Huns but the missiles were descending on the corrugated iron roof of Brigade Headquarters about two miles away.

At that time "Scotty" was twenty-six years old, and with the average age of fighter squadrons around twenty, he was senior to most of his fellow officers. His record as a tactician remains unsurpassed in the annals of the Air Force.

The Flying Scot was in the main re-sponsible for Rommel's rout in Libya, but as he himself so aptly describes it, "Hell, it was just a case of switching my mind back to when we had to shift our air-dromes when the Hun was chasing us in 1918, and the way we had to makeshift with spares, ammunition and fuel was exactly the same thing except instead of being chased this time we chased."

Today, at the age of fifty-three, Tedder is General Eisenhower's right hand man and he proved himself during the invasion. Unlike many other senior officers of the Royal Air Force, he has openly stated that he does not think Germany can be beaten by aerial bombing alone, and for the past twenty-five years he has been openly advocating the complete co-ordination of Air Force, Army, and Navy in any large scale offensive; to that end he took courses at the British Naval, Army, and R.A.F. Staff Colleges with the result that he does not have to inquire as to whether the Navy or the Army is capable of doing this and that but is in a position to form his own conclusions; so, no one could be better fitted to be the American leader's aide.

The work of the Royal Air Force during the so-called "peace" years has also been of great assistance to him. As an instance, in 1922 the Bedouin tribesmen in Mesopotamia started an uprising. Previous rebellions had cost the British taxpayers a lot of money, because it usually required three or four division of infantry and artillery many months chasing the tribesmen over the desert, usually arriving at some sort of stalemate without anything really being accomplished; so it was decided to employ the R.A.F. under Air Vice Marshal Sir John Salmond to "control without occupying." The tribesmen were faced with something they could not cope, and with only five squadrons under Salmond's command, in three months they had the Bedouins asking for treaty terms. It was during these operations that "Mary" Coningham gained his experience of desert warfare, which was of such help to him when he assisted Tedder in Libya.

The Royal Air Force has proved its worth in this type of work, and yet at this juncture the British Government decided to cut down the strength of the service.

In November 1918 there were 27,333 officers and 263,842 other ranks. By March 1920 it had shrunk to 5,300 officers and

54,000 other ranks; then, at the time of the Mesopotamian campaign against the Bedouins it was decided to halve this figure. In discussing the strength of the R.A.F. it is as well to look into the figures of the casualties suffered both in the last war and this.

In World War I the R.A.F., including the Dominions, had a total casualty list of 16,623—a larger figure than most people imagine, but nothing compared to the present war. Prime Minister Churchill in a speech in the House of Commons on February 22nd of this year made this statement:

"Excluding the Dominion and Allied squadrons working with the Royal Air Force the British Islanders have lost 38,300 pilots and air crews killed, and 10,400 missing, and over 10,000 aircraft—that is since the beginning of the war—and they have made nearly 900,000 sorties into the north European theatre."

Those figures are formidable and give us an insight into the vast amount of work the Air Force of today is under-taking. We must on the other hand remember that unlike World War I where the bombers were carrying crews of two, today they are carrying ten and eleven. Also for our side of the picture we can look back on the terrible toll our fighters took of the German bombers in the battle of Britain, and that brings up another famous British fighter pilot: Air Marshal Sir Stafford Leigh Mallory, K.C.B., D.S.O.

Like "Mary" Coningham he started in the ranks, then obtained a commission in the Lancashire Fusiliers, and similarly joined the R.F.C. in 1916. When the first World War finished he was given a permanent commission in the R.A.F. with the rank of Squadron Leader; like Tedder he studied at the Army and R.A.F. Staff Colleges. Through the "peace" years he saw service in Iraq as a Senior Staff Officer, and when the Battle of Britain was on he commanded the famous No. 11 Fighter Group and again came into the limelight when the Dieppe landing took place, for the pilots serving under him destroyed 93 aircraft during the raid. Also his son, like the son of Billy Bishop, joined the R.A.F. but he was invalided out owing to injuries received in a crash; however, daughter Jacqueline is still carrying on the family tradition, as a Flight Officer, in the Women's Auxiliary Air Force Services.

When speaking of Leigh Mallory one automatically thinks of Air Vice Marshal Harry Broadhurst, D.S.O. and bar, D.F.C. and bar, to note how similar the records of the outstanding pilots are; for Broadhurst again did not begin his military service with the R.A.F. but obtained a commission with the Royal Artillery; it was not until 1926 that he joined the R.A.F. as pilot officer. Like Bader he was noted for his flying capabilities and was chosen to fly at the Hendon Air Pageant where he distinguished himself by flying low over the ground inverted, teamed and tied to another machine.

His first active service was in 1931 on the North West Frontier of India when he helped to quell the Pathan rebellion. But his real battling came when he with No. 11 Fighter Group in the Battle of Britain, the evacuation of Dunkerque and the Dieppe raid.

The manner in which he won a bar to his D.S.O.—a bar to a decoration signifies it has been won a second time—is typical of the man. While leading a fighter sweep on a low ground-strafting expedition over northern France they were

(Turn to page 34)

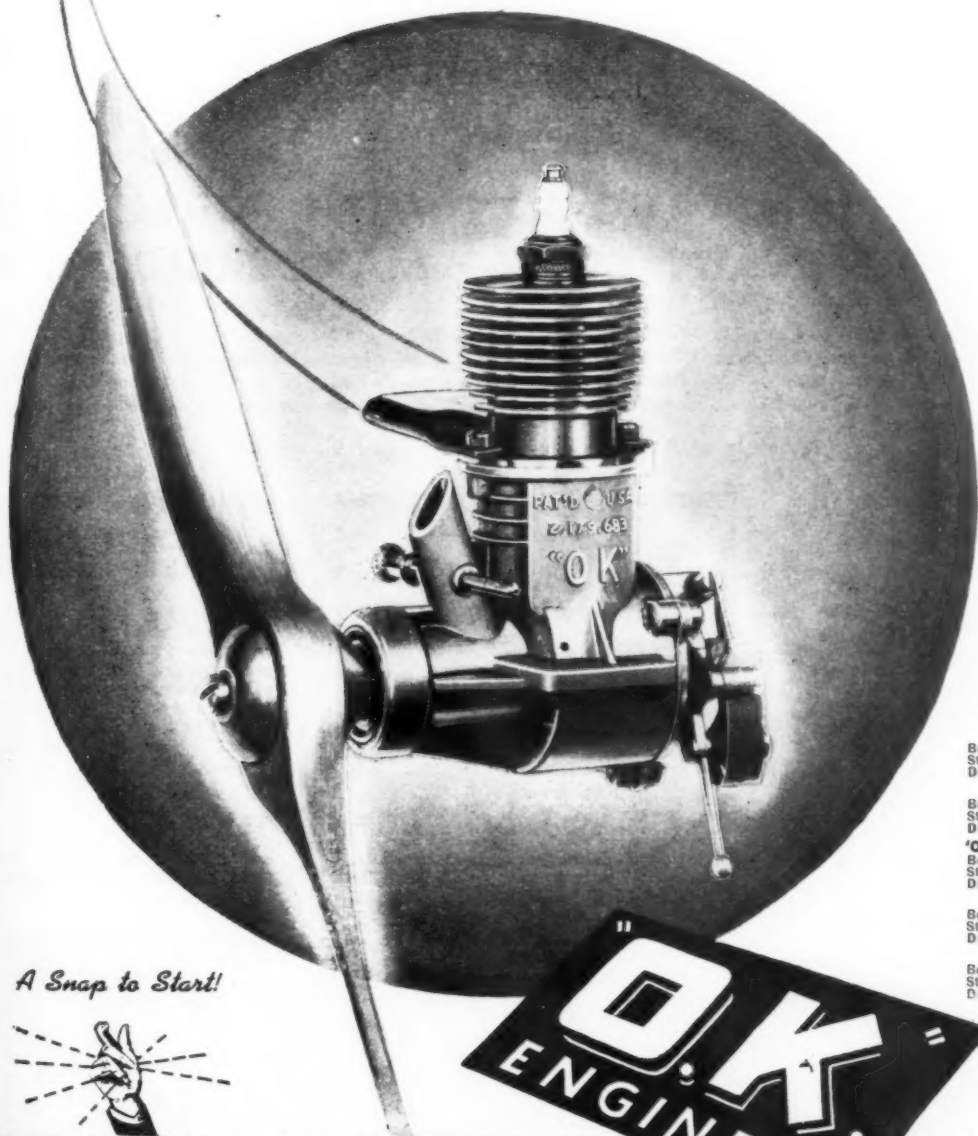
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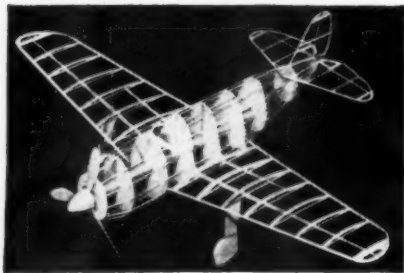
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jumped by several squadrons of Messerschmitts and Heinkels, outnumbered four to one. Broadhurst succeeded in sending two Me's down but then his Hurribomber was hit by cannon shell and one wing was holed. All the guns on the starboard side were put out of action, and another cannon shell tore open the fuselage just missing the oxygen flasks. He was wounded in both arms and both legs but continued the fight until the enemy broke it off; then he led his formation home, collapsing into unconsciousness from loss of blood immediately after landing.

A week after his hospital discharge he took part in the Dieppe raid where he won a bar to his D.F.C. It is no wonder Harry Broadhurst was so popular when he visited the United States to advise the American aircraft industry what was needed in fighters, for they were dealing with a man who spoke from actual fighter experience and not from text books and rumor.

At the present moment we are reading more of the exploits of Fortresses, Liberators and Lancasters in the thousands pounding Germany and the occupied countries. Again we have a leader who started in the ranks, Air Chief Marshal Sir Arthur Harris, K.C.B., O.B.E., A.F.C.; "Murderer" Harris the Germans call him, for he is head of Bomber Command, but to the rank and file he is known as "Bert" when his back is turned. There is no greater distinction in the Royal Air Force than to have a nickname which is used by all and sundry, such as "Mary Coningham," "Scotty" Tedder and the rest.

"Bert" started his military career as a bugler, and he now remarks, "Thank God they didn't give me an audition." The story of how he enlisted is a classic. When war broke out in 1914 Harris was on a trek in Rhodesia; the news reached him in the bush and he immediately made tracks for the nearest town; when he arrived the Rhodesian Volunteers had only two vacancies, one for a machine gunner and the other for a bugler, so he became a bugler.

When the regiment was disbanded in 1916 he decided he had done enough marching, so like Coningham he paid his own fare from Africa to England and obtained a commission in the Royal Flying Corps. He immediately became interested in night warfare; at that time Germany had started bombing London from Zeppelins, so he was given command of a night flying experimental attachment for the defense of London. It was one of his men, Captain Leefe Robinson, who destroyed the first Zeppelin over London in October 1916, but it was due to "Bert's" planning that the Zeppelin was cornered and shot down in flames.

After the armistice he decided to remain in the Air Service and was granted a permanent commission in the R.A.F. He saw active service on the North West Frontier of India during the "peace" years, and in 1927 the Afghans revolted against King Amanullah and his government. There were at that time 600 European men, women and children in the capital at Kabul.

The problem confronting the Indian government was how to evacuate those defenseless people. It was considered an impossibility to bring them down by road through the Khyber Pass, past all the warlike tribes of the North West Frontier Province, so the R.A.F. at Peshawar was ordered to do the job. The only aircraft available were Vickers Victorias, troop carriers; but in ten days, in spite of the hostile demonstrations at Kabul, the Vic-

torias, using an impromptu landing ground which today would be classed as impossible for even the use of Piper Cubs, had accomplished the evacuation without mishap. That was the first mass evacuation by air on record, and was a prelude to the present day succoring of the wounded from the far flung battlefields.

"Bert" Harris, like all other senior officers, attended the Staff Colleges, but he made an especial study of strategic and tactical bombing, so much so that on February 15th of this year his command was able to unload a matter of 2,500 tons of bombs on Berlin in twenty minutes. His brain and foresight made that possible, but the accuracy of the raid was due to the youngest Air Vice Marshal of the R.A.F.

Air Vice Marshal D. C. T. Bennett, C.B.E., D.S.O., was born at Toowoomba, Queensland, thirty-four years ago, and his career is remarkable. His promotion has been meteoric but deserved, and goes once more to show how great a part the individual plays in the R.A.F.

It was not until 1942 that he entered the service, but for the twelve years he had been engaged in civil aviation he had more than made a mark for himself. When, in 1931, he first went to England from Australia his fellow pilots nicknamed him "The Wonder Boy." At first it was used in ridicule by the senior pilots with whom he came in contact; but now the same epithet is used as a mark of admiration and respect. No one can challenge his navigational ability, and he may well be classed as the world's finest aerial navigator; for that reason he was elected in 1938 to fly the north Atlantic from Foynes in Ireland to New York in the Mayo Composite aircraft called the Mercury.

Many will recall his landing in New York harbor after he had been launched from the top center section of a Short Flying Boat. The next exploit which brought him into prominence was when, while still a civilian and flying an unarmed Short Flying Boat, he rescued the Polish leader General Sikorski from Bordeaux when France capitulated in 1940.

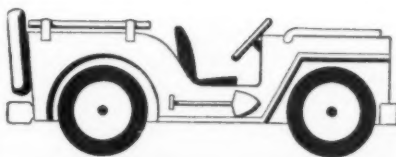
It was only natural he should be selected to help inaugurate the Ferry Command from Canada to England in the latter part of the same year. When the R.A.F. took over the organization, known as The Trans-Atlantic Ferry Service in 1942, he resigned his position as Chief Pilot and joined the R.A.F. as a Wing Commander and was posted to Bomber Command.

On a bombing mission to the German naval base at Trondheim in Norway his Lancaster was literally blown to bits, but he bailed out successfully, and traveling by night and hiding during the day he made his escape over the border into Sweden and eventually got back to England. It was after that escapade that he fostered the idea of the Pathfinderers. He took his thoughts to "Bert" Harris, and between them they formed that group whose duty it is to lead the mighty armadas of bombers who are pulverizing German cities and war plants.

Now, at the age of thirty-four, "The Wonder Boy" commands the Pathfinderers, and has more than earned the C.B.E. and D.S.O. which were awarded him for courage and devotion to duty.

Over all these men, receiving hardly any publicity, is Marshal of the Air Force, Sir Charles F. A. Portal, K.C.B., D.S.O., M.C. His job as Chief of the Air Staff is not spectacular, and many a young pilot doesn't realize that "Charlie" was a fear-

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less fighter pilot in World War I. His job now is to coordinate all the Commands under him, and he appears to have an austere and solemn bearing, far different from the days twenty-eight years ago when he was a carefree junior Flight Commander.

A brief pen picture of him today can be drawn from the remark of a very junior intelligence operations officer at a Command Station somewhere in the south of

England. Portal, without a smile, had been listening to the briefing of a sweep; seldom would he interject a remark or ask a question. Then, at the close, he merely said, "Good luck, gentlemen," turned on his heel and walked out. A young Flight Lieutenant looked after his retreating back, saying:

"Just like the sphinx, but my God, what a brain!"

VICTORY

Talking Shop

(Continued from page 17)

in different sizes and shapes for all types of work. To start with, a single 3/8" gauge is satisfactory for a considerable range of work.

Jeweler's files come in many sizes and forms for shaping wood as well as metal. They are especially handy for making odd shaped holes in balsa.

A set of drills is very handy for both wood and metal. Several useful sizes are Nos. 30, 40 and 50, bought very reasonably in sets of assorted sizes. A holder for the drills is shown in Fig. 2.

A small screw driver, hammer and saw are useful for special jobs such as motor mounts, driving dowels and cutting balsa stock in large sizes.

A large pine drawing board, the larger the better, is essential for assembly work. These may be purchased cheaply at any art store. Do not assemble on the top of the working desk; pin holes and cuts soon ruin it. Both sides of the drawing board serve best, and even when full of pin holes a good heavy wrapping paper cover makes it useful for a while longer.

Speaking of pins, the "push" or "T-head" type is best because the common straight pin is hard on the fingers when being pushed into a moderately resisting board. Push pins do not bend so easily, being much shorter and quite simple to remove. Thumbtacks are too short for most model work and their large heads frequently cover up an uncemented joint which is discovered only after removing the tack—maybe too late.

Small weights are useful on assembly jobs. Storage battery repair men use bars of lead 1' long and 3/8" wide which, when cut into short 2" or 3" lengths, make very handy weights for holding pieces on which cement is drying.

Metal working tools are becoming more important to the model builder who advances into the gas model stage, and some of the more practical are a small hacksaw with several blades (fine, medium and coarse), a small hand or electric drill for the drill points mentioned earlier, metal cutting shears and a soldering outfit. The latter consists of a light iron, preferably electric rated 75 to 125 watts, soldering paste, wire solder and rosin core solder. Rosin core solder should always be used for electrical connections and the like, but non-corrosive paste and solid solder are easier on such parts as steel wire, tinplate, etc.

Most rubber model builders steer clear of soldering and not a few gas modelers take their model over to a friend's house for soldering. As the modeler progresses into advanced gas model construction he will find the art of soldering more and more useful. Therefore, it is wise for the rubber builder to learn soldering as early in the game as possible. He will find it useful on landing gear struts, both at the wheel and in the structure itself, as well as various other wire and metal fittings.

In the gas model electrical system, there are usually two or three soldered joints required, each one vital to the performance of the engine. Twisted connections hold for a time but eventually they open up or become oil soaked and the engine stops.

Oxygen, in the air, combines with the surface of metals to form a thin coat of oxide which, unlike the parent metal, is a very poor electrical conductor. When two copper wires are twisted together it is only a short time before a layer of copper oxide forms between them. The heat from the engine greatly accelerates this action, evidenced by uneven engine operation and difficult starting.

Scraping the wires clean before twisting them is useless because the oxide begins to form as soon as the clean metal is exposed to air. Soldering is the only sure way to join them; the builder then knows that the joint will stay clean electrically. Another advantage of soldering is its resistance to vibration as a soldered joint does not shake loose.

Oxide makes it impossible for solder to stick to a joint, even though the wires are scraped perfectly clean, so a substance known as flux is used to make the solder adhere. Two kinds of flux are available, rosin and acid, each of which has its definite purpose and can be purchased in wire form. Rosin core solder is primarily for light joints, like radio and electrical connections. It is capable of removing only a very light coat of oxide and is more difficult to handle than the acid type.

Solder with an acid flux is preferable in model building because of the wide variety of materials used: copper wire, brass sheet, steel music wire and springs, etc.

The only tools required other than the soldering iron and solder are a file and a knife for scraping. A torch should never be used for model soldering, the wires are too small to make this necessary and besides it is a fire hazard.

In soldering, always remember that everything must be clean. The tip (copper) must be clean and covered with a smooth coat of solder. If not, file it clean of all oxide deposits about 1/2" back from the tip on all sides. Apply soldering flux or paste and rub the solder strip to the point leaving a bright covering. The soldering iron is now "tinned," which means that it is ready for use.

For soldering wires, remove the wire insulation for 1/2" to 3/4" back from the end as in Fig. 4. Scrape the ends well with a knife and twist the strands together smoothly. Join the two ends and twist them together. If paste flux is used, apply a small amount to the joint. Hold the tip of the soldering iron to the joint until the flux boils or sputters, then apply

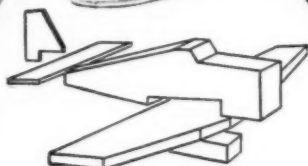
(Turn to page 38)

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the solder. With flux core solder, the solder and iron must be applied simultaneously to the joint so the flux core is melted and released.

On a well done job, the solder follows smoothly all the contours of the joint and there are no adhering drops, sharp points, or dull, jagged areas. It is usually advisable to spread the solder over the joint with the tip of the iron in order to achieve good results.

If the solder doesn't flow freely but acts rather mushy and goes on in lumps, more heat is needed. A small iron, used on heavy work or sheet metal, loses considerable heat through transfer to the metal so the work must be suspended frequently to allow the iron to heat up again. If the solder flows freely but rolls off the joint in small spherical lumps, the cause is either insufficient flux or the iron was not held exactly on the point to be soldered. Remember that the wires, or other parts to be fastened, must be heated to the temperature of the molten solder before a successful joint can be made; it is not enough just to heat the solder itself. As long as the tip of the soldering iron and the parts themselves are clean, and the solder and joint are hot, you will have a good soldering job.

When two pieces are being soldered with one held manually, the inexperienced workman usually releases them too soon, causing the pieces to fall apart and requiring the job repeated. Molten solder is bright and shiny. When it turns a grayish, foggy color it has solidified and the work can be released.

Jersey Skeeter

(Continued from page 23)

After the joints dry, cement the nose block into position. These three steps are important and must be done with precision to guarantee that the fuselage is in perfect alignment. The remaining cross braces and sheeting are added. It is advisable to construct a small weight box in the nose and firmly cement in place a small piece of lead about 1/2 oz. in weight. At this point give all the joints another coat of glue for utmost strength. The fuselage is then sanded thoroughly using fine sandpaper to remove any roughness which might mar the covering job. After the addition of the celluloid windshield the ship is ready to be covered with tissue. Be sure to have the grain of the tissue run lengthwise when covering to prevent wrinkles. The covered fuselage is then sprayed with water and, when dry, two or three coats of thin nitrate dope are applied.

WING—The wing is of multispar construction, a light but strong method. First the ribs are cut from 1/16" sheet. The easiest way to do this is to cut 25 pieces of wood to the exterior size, clamp them together, and cut them to shape with a jig saw. Thus all the ribs will be identical. The trailing edge is tapered, notched and sanded and the leading edge is carved and sanded to shape before construction starts. Each section is then built directly over the plan, complete with all the spars, etc. The sections are then joined, forming the correct dihedral, by using blocks under the joints to support them while drying. The gussets are now added in their proper positions. These are important to the strength of the wing. Sand the wing thoroughly and give every joint an extra coat of glue. The wing should be covered with tissue one section at a time, the bot-

MACHINERY

For the modeler, one of the most useful power driven tools is a small hand-held motor run from a wall socket and to which almost any imaginable tool can be attached. Difficult to obtain now, these tiny gadgets were manufactured under a variety of trade names and over a large price range, but they were all very similar and had great utility value. With such a tool, a variety of drills, wood cutters, sandpaper drums, etc. can be placed in the tiny chuck provided. Plan on a small electric drill after the war; the time saved by the sandpaper drum (about 1" in diameter) alone will make it worth your while.

For the larger tools, a small motor of about 1/4 hp is handy. This motor can be used to run a variety of tools, a drill press for instance. Besides quick and accurate drilling, the drill press may be used for turning out small pieces, and for sandpapering. A small sandpaper drum consisting of a rubber core on a shaft with jointless rings of sandpaper or emery cloth could be purchased before the war. It is amazing how much time can be saved with one of these machines compared with hand methods when roughing out such parts as propellers, solid scale fuselage and wings, etc.

Power saws are frequently useful, particularly small buzz saws and jigsaws. With a jigsaw, commercial kit models can be made in about one-fourth the time by cutting out the stamped ribs, frames, etc. in almost one continuous motion.

VICTORY

tom sections first. Be sure to have the grain of the tissue running spanwise and glued to every rib on the bottom. By wetting the tissue lightly when applying it to curved surfaces, wrinkles are avoided. Spray the entire wing with water and give it one coat of thin nitrate dope. It is advisable to use thin dope solutions on a curved surface as it evaporates quickly and prevents "runs". Now is the time to remove any warps which may have developed. First remove the warps by steaming the wing over a tea kettle, and then immediately pin it to a flat surface and give it a coat of dope. Give the wing at least three coats of dope.

TAIL ASSEMBLY—The tail assembly is constructed the same as the wing except there are no dihedral breaks. The rudder is cemented firmly to the stabilizer before covering is attempted.

ASSEMBLY—Firmly glue two hooks into the right longeron (looking from the rear) which serve as tow hooks. These may be bent from ordinary straight pins or fine music wire. A hook for the tail elastic is also fastened at the rear of the fuselage. The wing and tail assembly are held by elastics.

FLYING—Hand launch the model several times to secure the proper glide. If it does not balance at the midpoint of the wing (when fully assembled), add or take off clay from the nose until it does. The rudder should be adjusted for a 200 ft. circle to the right. Make first flights in calm weather as the ship may be more easily adjusted. A 100 ft. string serves as a towline. With the tow hooks on the right side of the fuselage and the rudder set for a right circle, the ship should tow

(Turn to page 42)

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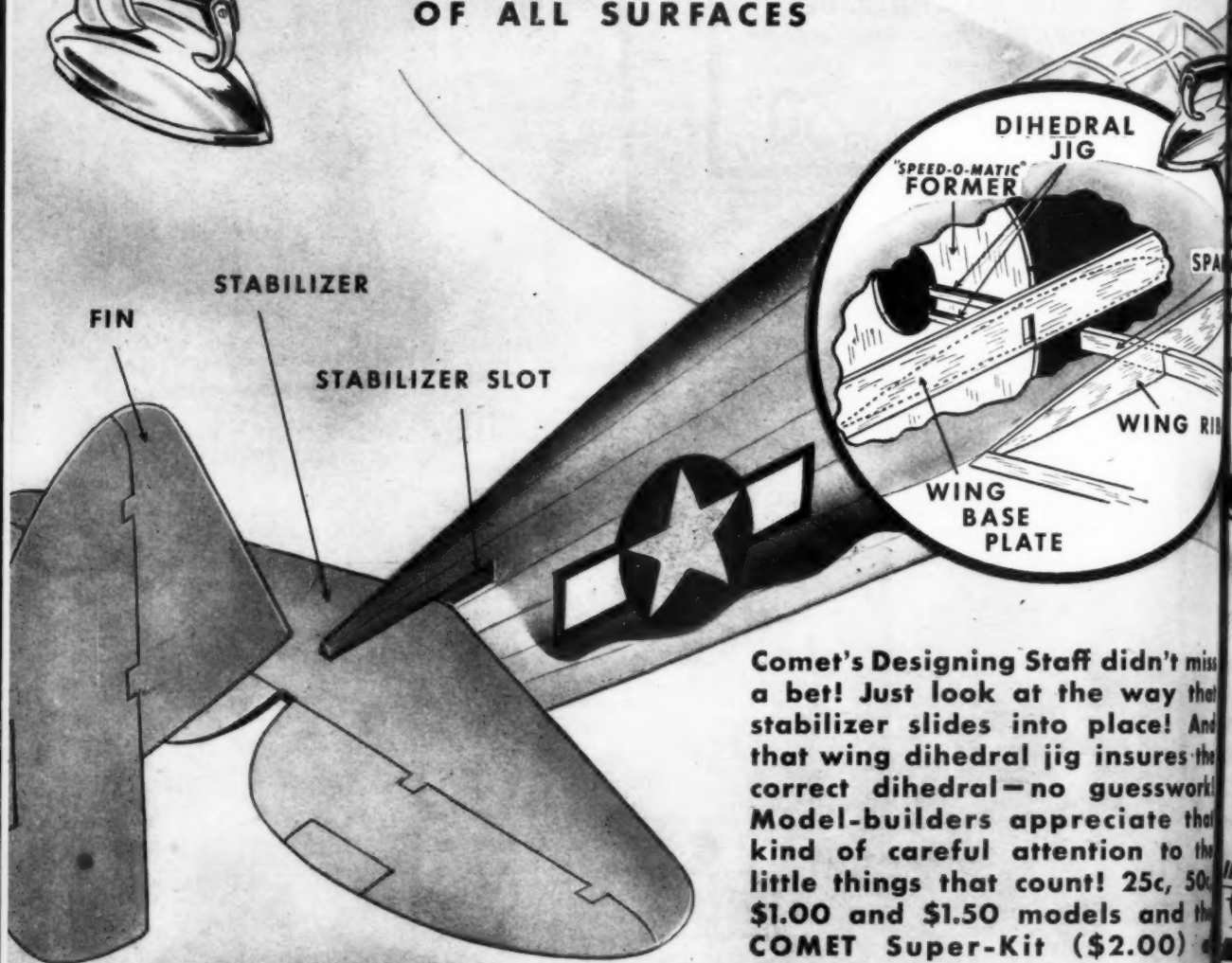
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4 Port 2 Stroke Cycle— 300-7,000 R.P.M.—
3/4" Stroke— Bearing Surface,
15/16" Bore— 1 1/4" Long—
Crankshaft, 5/16" Diam.
Motor Weight, 10 oz.—Rotation, Either Direction
Invertible — Runs on 2 Flashlight Cells —
Runs 27 Minutes on One Ounce of Fuel
Height, 4 1/2"—Width, 2 1/2"—H. P. Approx. 1/5th
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This engine has been tested and proven over the last ten years. Over one hundred thousand of these powerful little G.H.Q. engines are now in actual daily use. Why not join the ranks of these hobbyists? Study these unusual features that you will find in your engine:

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Compare these features that make the G.H.Q. Gas Engine a winner!

1. Easy starting.
2. Steady running—as long as gas, oil and spark are supplied.
3. Motor starts and runs on two flashlight cells.
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5. Piston and cylinder features: piston constructed of one piece, with uniflow baffle and high compression head, centerless ground to within .0002". Cylinder is selected grey iron for long life, Hutto-honed to within .0001" of absolute roundness. Piston and Cylinder are hand fitted to insure perfect compression.
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7. One-piece drop-forged chrome-nickel steel shaft, perfectly balanced and centerless ground. Absolutely unbreakable.
8. Main bearing (1 1/4 inches long) is reamed and lapped to perfect fit.
9. Connecting rod of high-speed bronze.
10. Carburetor is accurately designed—extremely simple to operate.
11. Timer assembly compact, fool-proof, long-wearing, replaceable and adjustable. Genuine tungsten points. Not a cheap "wipe" timer but a real aviation type "make and break" system.
12. Coil will not overheat or short circuit; convenient terminals make soldering unnecessary; oil, gas, and water-proof; not a pee-wee—but a husky, yet lightweight, spark coil that will give a maximum spark.
13. Condenser is gas, oil and waterproof.
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17. Speed range 300 to 7,000 R.P.M.
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READ WHAT G.H.Q. ENGINE OWNERS SAY (among letters received this year)

R. D., COTATI, CAL.: About one year ago I purchased one of your G.H.Q. Motors. I am glad to tell you that the G.H.Q. Motor is a very fine motor. I have been using it in a Super G Shark. In the past year we have been having many model airplane contests and I have won nearly every one with my Super G Shark powered by your G.H.Q. motor. My G.H.Q. motor has been giving me excellent service.

J. N., BRECKENRIDGE, MINN.: Am having good results from my motor.

E. D., PLEASANT HILL, MO.: Received my G.H.Q. motor in fine shape. Very well satisfied, and think it is a swell little motor, runs fine. A friend of mine wants one too, so wanted me to order it for him.

C. C., SOUTH HILL, VA.: I bought a G.H.Q. engine from you last September and installed it in a six foot wingspan airplane. In engine performance, the engine you sold me passed with flying colors. I congratulate you on putting so much performance in my engine at so low a cost.

G. F., PITTSBURGH, PA.: My G.H.Q. engine has given very satisfactory service for several years now.

E. B., J., TALLAHASSEE, FLA.: I have a G.H.Q. engine that I purchased from your company a short while ago and it operates satisfactorily.

N. L. B., N.Y.C.: I received my G.H.Q. motor in fine shape. It runs swell and I am sending another order to you.

M. B. H., OMAHA, NEB.: I think the G.H.Q. motor is the best motor I have ever seen.

A. Z., TEXARKANA, TEX.: I have had about seven of your motors in the past and think quite a lot about them.

B. D. J., SAN FRANCISCO, CAL.: I already own one of your G.H.Q. engines and it performs like new.

R. D., GLEN ALLEN, VA.: I started it with only a few turns of the propeller and was very pleased with it.

J. M., ARLINGTON, VA.: I've had one of your motors for about three years now and it's still going strong.

C. C. N., AMARILLO, TEX.: Before my induction into the Army I built a few models which incorporated your G.H.Q. motor. I found it satisfactory and put a great deal of faith into it because of its dependability.

D. B. R. JR., LITCHFIELD, CONN.: I purchased one of your engines a few years ago and it is still in working order. I have used it in boat models with great success. I am particularly impressed by its coast-starting qualities. These are very valuable in a boat where it is more difficult to start an engine. Usually, only one attempt is needed once the engine has been primed. As a matter of fact, my G.H.Q. motor starts easier now than when I bought it. The motor has satisfied me very much.

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3" widths or 36" lengths cost 3 times 1st. 36" wide costs 6 times 1st.

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1/64x1 1/2	3 for 10c
1/32x1 1/2	6 for 10c
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18" Strips

1/16 sq.	15, 5c
1/16x3/16	8, 5c
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3/32 sq.	10, 5c
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RELEASES 4 CHUTES IN FLIGHT Flies 1 mile, climbs 1000 ft. per minute. Real contest model. Many finished parts; chute-making, automatic release, full size plans.

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.005 clean, beautiful, shiny for covering, etc. 3" wide, 6 ft. 15c
Aluminum Tubing 1/4" or 3/16" per ft. 15c

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Med. 8c. Large 10c
Gas Model.....25c

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.014.....3 ft. 2c
.020-.028 3 ft. 3c
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.045.....3 ft. 5c
1/16".....3 ft. 7c
3/32".....3 ft. 15c

'U' Control Wire on spools:

100'.....65c
Wing-Tail Light (Set of 3) 5/16" 8/16" 9/16".....10c
1 1/16".....12c
Celluloid Radial Motors 1 1/4" 10c
2 1/4" 2 1/2" 20c
3" 25c.

Thrust Bearing 1 1/2 doz. No. 8c. 12c
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1 1/2" 2 1/2" 20c
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CEMENT. CLEAR DOPE. THINNER OR BANANA OIL

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1/4" x 1/4" x 3/4	3-5c
1/4" x 1/4" x 1	2-5c
3/16" x 1/4" x 10/16	3c ea.
3/16" x 1/4" x 1 1/2	4c ea.
1 1/4" x 1 1/2	6c ea.
1 1/4" x 1 1/2	8c ea.

RITZ GAS PROPS

Quartzed Plain Bass Gumwood 40c.....8" 20c
40c.....9" 20c
40c.....10" 20c

3 BLADED PROPS

1 1/2".....10c
2 1/2".....15c
3 1/2".....20c
4".....35c

CONTROL WHEEL

Plastic 1 1/2" dia. for P.H.B. Jeep.....10c

DOWELS

1/16"x12" 6
1/8"x12" 5c
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1/4" x 1/4" x 1	2-5c
3/16" x 1/4" x 10/16	3c ea.
3/16" x 1/4" x 1 1/2	4c ea.
1 1/4" x 1 1/2	6c ea.
1 1/4" x 1 1/2	8c ea.

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1/4" x 1/4" x 1	2-5c
3/16" x 1/4" x 10/16	3c ea.
3/16" x 1/4" x 1 1/2	4c ea.
1 1/4" x 1 1/2	6c ea.
1 1/4" x 1 1/2	8c ea.

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"Superette" 1.75
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3/16" x 1/4" x 10/16	3c ea.
3/16" x 1/4" x 1 1/2	4c ea.
1 1/4" x 1 1/2	6c ea.
1 1/4" x 1 1/2	8c ea.

RITZ GAS PROPS

Quartzed Plain Bass Gumwood 40c.....8" 20c
40c.....9" 20c
40c.....10" 20c

3 BLADED PROPS

1 1/2".....10c
2 1/2".....15c
3 1/2".....20c
4".....35c

CONTROL WHEEL

Plastic 1 1/2" dia. for P.H.B. Jeep.....10c

DOWELS

1/16"x12" 6
1/8"x12" 5c
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Small 79c; Deluxe Large 89c
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BRASS BUSHINGS

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White only. Gas Model 3 for 25c; Rubber Power, sheet.....3c

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Flying Fortress

(Continued from page 21)

when military production was resumed, Boeing was ready to take on a new Army order for 200 pursuit ships.

Their engineers, intent on making sound, sensible airplanes, became noted for their progressiveness. They made sensational developments in the industry. One was a practical training plane, the PW-9, that carried the first oleo shock absorber. They built a 13-ton patrol boat with a metal wing structure—the Navy's original "flying dreadnaught," the PB-1 of 1925. They produced the first air-cooled fighters, the F2B-1, to be used aboard Navy aircraft carriers.

Then came one of the greatest romances in aviation—the air mail! When the Post Office Department asked for bids on the Chicago-San Francisco route, pulses quickened. Boeing's bid landed the contract and on July 1, 1927, a fleet of 25 Boeing mail-passenger planes pioneered the first extensive air transport operation in America.

Boeing Air Transport grew. Beacon lights dotted airways. The mail flew on at night. Operating both an air line and a factory, Boeing men studied practical problems of safety in the air. Engineers developed plane-to-ground communications, and equipment was soon installed in every airplane in the country, foundation of the radio system, now backbone of air safety.

In 1930 came the revolutionary Boeing Monomail, built with duralumin skin for easy maintenance and greater safety; a single low wing, supported from within by a bridge-like truss structure and landing gear that disappeared into the wing during flight to complete streamlining. The Monomail streaked into prominence as the initiator of a new design formula that has been followed ever since in air transport construction. It was a design that made possible greater efficiency as airplanes grew in size. It was a design that became the formula in the construction of future large aircraft, of heavy bombers.

Today's *Flying Fortress* is a descendant of Boeing's successful efforts during this period to streamline air transports, give them the endurance of long-range single-seaters and the speed of pursuit ships. But directly, the *Fortress* is the answer to a conversation back in 1930 between Admiral Joseph Mason Reeves, then commander of the Pacific Aircraft Fleet, and Clarimont Egtvedt, chairman of the Board of Boeing, then vice president.

During that chat, Admiral Reeves deplored the fact that the Navy had no air weapon comparable in striking power to the battleship. Egtvedt, his imagination caught by the possibility, hitherto unrealized, of a great weight-carrying airplane, went back to the designing board.

The new ship, the B-9 with two engines tucked into the leading edge of the wings, was a hypodermic to military aviation design. The Army Air Corps termed its performance "astounding." In turn, the B-9 served as advance design for blue ribbon commercial transports which now were turned out in all-metal, streamlined, twin-engined monoplane jobs. Other advancements carried by the early bomber were control surface trim tabs, supercharged engines, automatic pilot, de-icing equipment, increased cabin comfort and new safety factors, such as ability to climb on one engine with a full load.

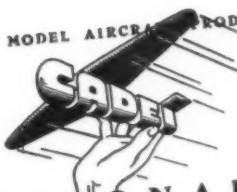
The B-9 really served on an engineering team's warming-up exercise for

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GLIDERS



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It will be some time before we can give definite specifications and prices for the new line of kits planned, but please take our modest word for it, they will be up to a fine standard of comparison on every count when they are ready for distribution.

Again and to all

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6. Fine workmanship throughout.
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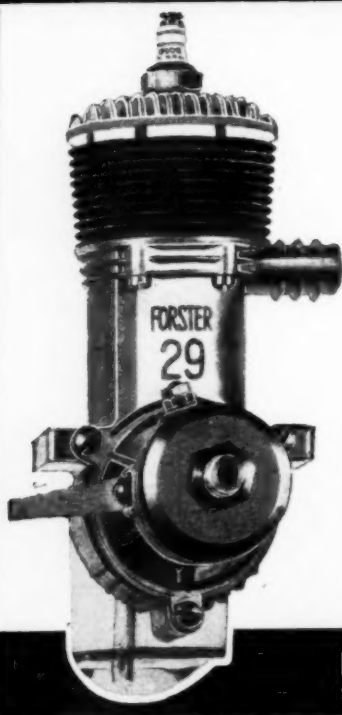
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transport design as evidenced in Model 247, the original all-metal, streamlined, twin-engine monoplane transport. One American columnist of the time hailed the 247 with these words, "almost as though a touch of magic." America's first three-mile-a-minute air transport actually pioneered the whole troop of recent advancements for which the United States is famous.

The greatest advance, however, was yet to come. This was the "mystery ship" of 1935, America's first four-engine bomber, the original *Flying Fortress*. Engineers called this the 299 and in the ship were combined the long range, huge bomb load capacity and the speed of a pursuit plane. The Army ordered 13 of the big ships and they distinguished themselves with spectacular flights to South America and record-breaking speed dashes from coast to coast.

Boeing engineers installed the turbo supercharger, in effect an oxygen mask for the engine. The charger is a power-driven blast fan which forces air under pressure into the carburetor, giving the plane revolutionary performance at extreme altitudes.

Even while the 299 was being developed, progressive Air Corps officers, impressed with the idea of a long-range bomber, commissioned Boeing to design and build experimentally a still bigger plane. The resulting giant weapon, known as the B-15, was 30 tons of airplane, with wings that spanned 150 feet, really an eighth wonder of the air. The B-15 first flew in October 1937 and set international records for load-carrying and range.

Progressive development of the *Flying Fortress* and the B-15 began to bear fruit in the field of commercial aviation. Design features which on paper seemed fantastic now became a reality. Engineers integrated 54,356 parts of the giant Model 314 *Clipper*. The airplane had two decks and accommodations for 74 passengers! A hull volume equal to a five-room home! A dining salon and a bridal suite! It was the first aircraft that could fly both the Pacific and the Atlantic on a commercially practical basis.

Boeing's achievements with four-engine land planes were even more spectacular. The *Stratoliner*, even in its name, represented a great new phase of the conquest of the air. The clear, blue, smooth air regions of the stratosphere, 15,000 to 20,000 feet above sea level, high above normal surface weather conditions, had long invited commercial aviation.

The *Stratoliner* was equipped with a cabin supercharging system that provided low-altitude atmospheric conditions at all times and made this upper level accessible to air travelers.

With these developments in the Seattle Boeing headquarters, the pace quickened in Wichita, Kansas. There the growing Stearman factory, which had changed in status from a subsidiary company to the Stearman Aircraft Division of Boeing, and soon identified itself more closely with the Seattle firm with the new designation of Boeing Airplane Company, Wichita Division, was working on training planes in great quantities. It held the largest orders for primary trainers ever placed in peace-time by the United States Government with one manufacturer.

The second chapter of the Boeing Aircraft Company, dating from Dec. 7, 1941, is still being written. It is a chapter of production, all-out production of America's potent air weapon, the *Flying Fortress*, and a story of the effectiveness of this weapon in action on war fronts.

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with these famous planes, Uncle Sam's sky giants are making regular "milk runs" on their Missions to Victory. Here are super-detailed built-up flying scale copies! See them at your Modelcraft dealer. Whatever you build, you want the BEST—meaning MODELCRAFT.

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Theme song of the Jap pilots: "I'm nothin' but a nothin'." But this is a detailed flying scale model that will give you a good idea of why OUR planes are beating the pants off the Japs. 1/4" scale (plus 15c postage).....

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Build it in 20 minutes!

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Last month we said, "If you're not building your models with Modelcraft kits, you're working too hard!" Well, the GREMLIN here proves it. All parts are die-cut from genuine balsa and finished down so fine that a little extra dressing with sandpaper will put them in flying shape. Full size plans make it easy to duplicate parts if you break any. Gremlin kit complete (plus 15c postage).....

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If you could measure glory and achievement with a yardstick, the planet Mars would be a whistle stop for the Flying Forts. For these big bombers have proven their worth time and again and at odds that'd make washing an elephant seem like a little two-bit job. Our flying scale model of the B-17 is something our designers are extra proud of. You'll be proud to build her, too. Scale 1/4" to the foot with nearly 27" wingspan. A lot of model for only (plus 15c postage).....

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Glance at the sleek lines of the "Cobra" and you'll see one of the reasons for its great speed. Examine it closely and you'll see the armament it packs. Put 'em together and you've got a dashing, slashing fighting unit the enemy shies away from. Super-detailed. 3/4" scale flying model with complete plans. Kit (plus 15c postage).....

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If you want a "fancy dancer," don't build Miss Tiny. But if you want a ship that's designed on sound aerodynamic principles, that has a long string of



victories, and that really LOOKS like an airplane, Miss Tiny's the gal for you! All-balsa kit, with full size plans.....

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throughout the world. Perhaps the most outstanding achievements were those of the engineers who were able to incorporate new design changes to meet military demands, without lessening the steadily increasing output.

Months before America's entrance in the war, Boeing had toiled and scaled itself for quantity production. Steel and concrete grew into a new factory area at Seattle, headquarters. A special plant, broad-bayed and airy, designed for big airplanes in big numbers, grew to tremendous proportions.

Tooling engineers restudied the process of manufacturing every airplane part. New machinery was purchased or invented to meet the emergency task of building, in months, an industry of proportions that would normally take years. The *Multiline System*, a new efficient production plan came into being. Its basic feature was the introduction of a series of short production lines instead of one long one. The system involves pre-completion, insofar as possible, of each major unit of the plane. Final assembly is thus largely a process of joining and hooking-up major parts. Planes are rolled out the door ready to fly.

Now meticulous, patient research rewarded Boeing engineers. Their experiments in high altitude by means of a *Strato-Chamber*, made possible immediate fulfillment of Army orders for big bombers able to fight high in the skies. No stunt gadget, this *Strato-Chamber*, first such development, permits complete testing of both men and equipment under stratospheric conditions that might be encountered in flight.

Under extreme ranges of air pressure, equipment is studied so that engineers know just how machines will react in substratosphere conditions. Many airplane parts are also tested in a Boeing laboratory where temperatures as low as -80° F. can be reached. Extreme "punishment" is also meted out to structural equipment in the Boeing Research Center, for Boeing is intent on producing a perfect machine, as perfect as human engineers can make it.

Always the pioneer, Boeing introduced still another test development, the *Strato-trainer*. A low pressure chamber that can attain altitudes higher than anything previously achieved, and which can climb six times faster than the finest pursuit ship in the world, is used for physiological research and the training of high altitude crews. Primary purpose of the *Strato-trainer* is to train crews in safety precautions necessary while breathing oxygen at high altitudes.

While the war in Europe was still in its early stages, the War Department, recognizing the need for four-engine long-range bombers, requested that Boeing and two other Pacific Coast aircraft firms pool their facilities for producing *Flying Fortresses*. As a consequence, today Douglas Aircraft Company and Lockheed Aircraft Corp. are also turning out these giant ships.

Flying Fortress production figures are a military secret, but it is no secret that the number of these heavy bombers is steadily increasing. Current rate of production is more than ten times greater than it was at the time of Pearl Harbor. Boeing now makes a *Flying Fortress* in one-third the man hours required at the outbreak of war. The contract price has been reduced by one-half.

One of the most important Boeing achievements last year, but one largely restricted from publication, was the completion of testing and start of production

of the giant *Superfortress*, the B-29. This bomber, the greatest air weapon ever to roam the skies, has been a closely guarded military secret. (See page 13).

General H. H. Arnold, commanding the U.S. Army Air Forces, revealed in a carefully worded announcement that the B-29 is a plane which places previous four-motored bombers in the "light-heavy" class.

"The B-29 will have a range substantially greater than the maximum effective range of today's longest-range heavy bombers and it will carry quite sizeable bomb loads for that distance," the general said. "This battleship of the air is armored heavily with multiple-guns, power turrets and can fly at very high altitudes."

General Arnold characterized as "superb" the combat records of previous heavy bombers, the B-17 *Boeing Flying Fortress* and the B-24 *Consolidated Liberator*, but said that the B-29 "is as far ahead of these two aircraft as they are out in front of pre-war bombers."

The Renton Division of the Boeing Aircraft Company and the Wichita Division of the Boeing Airplane Company both are producing the *Superfortress*, as are Bell and Martin plants which are cooperating in the production of the new Boeing design.

Wichita Division has specialized also in the development of the PT-17 *Primary Trainer* for the Army and the N2S-1 and N2S-2 *Primary Trainers* for the Navy. More of these trainers have been purchased than the sum total of primary trainers built by all other American aircraft manufacturers. These trainers have been extensively used by the Air Forces of China, Venezuela, Brazil, Argentina and Cuba. The Boeing *Primary Trainer* is to World War II what the Curtiss JN-4 (*Jenny*) was to World War I, the airplane on which most American fledglings are winning their wings.

Meanwhile, it is the famed *Flying Fortress*, based on the 22-ton 299 that continues to bring aerial war to the enemy's home front. The B-17 series of *Fortresses* has been produced in more than eight different models, each design change dictated by military needs. Engineers made more than 600 design changes in single models. Each succeeding model bristled with added armament, ever-increased firepower. Guns roar destruction at the enemy from every conceivable position on the giant ship.

These guns provide 13 good reasons why the *Fortress* is regarded as possessor of the most devastating firepower of any airplane in the skies. They operate from the tail, from the waist, the top and underside approaches and, in the latest formidable model, the B-17G, from a new chin turret. With a top speed in excess of 300 miles per hour, a maximum bomb load of approximately 10 tons and a maximum ceiling of more than 40,000 feet, the *Flying Fortress* utilizes every inventive genius, every engineering feat of the Boeing Company to meet and beat the enemy.

Fortress Genealogy

XB-17

In 1934 the (then) Army Air Corps Materiel Division at Wright Field, Dayton, Ohio announced a competition for multi-engine bomber planes and issued a circular proposal to various interested manufacturers which specified that the new plane should have a maximum speed of 200-250 miles per hour, an operating

(Turn to page 50)

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C. L. Egtvedt had been toying with the "flying battleship" idea ever since his talk with Admiral Reeves. And the "multi-engine" phrase in the specification kept turning over in his mind with the question: "Why not four engines?" The temptation proved too much and Egtvedt decided to risk everything on the idea of a true "flying battleship."

At work in the engineering department's fuselage structure group was a 24-year-old Stanford graduate, Edward C. Wells. Egtvedt appointed Wells Project Engineer on the new bomber which was designated Model 299. Wells pitched into the task, broke the job down into the proper groups and assigned each of them to an assistant. He selected the fuselage structure and arrangement for himself and the team went to work.

By the first week in July 1935 the plane was completed, an amazing design performance. The following week last installations were made and the engines started. The third week found the ground tests practically complete. On July 28, 1935, the monster rolled down the runway and took to the air for the first time with Chief Test Pilot Leslie R.

Tower at the controls. Through the ensuing days minor changes were made and the giant plane was groomed for a back-breaking test.

On August 20, 1935, the Model 299 took off at Boeing Field, Seattle, Washington and soared into the air, pointing its sharp nose to the east. On board were Chief Test Pilot Tower, Assistant Test Pilot Louis Wait, C. W. Benton, Jr., mechanic, all of Boeing and Henry Igo, service engineer of Pratt & Whitney, manufacturer of the engines. The bomber came to rest at Wright Field, 2,100 miles away, in just 9 hours, an average speed of more than 232 miles per hour. Tower stated that only cruising rpm (62½%) was used on the flight and that an altitude of 12,500 feet was maintained most of the way.

At Wright Field the plane, known technically as the Boeing XB-17, was subjected to preliminary performance tests and several revealing flights were made. On October 30, 1935, preparations were made for a routine test flight, the engines were warmed up and the takeoff run started. The bomber rose from the ground normally but the nose continued to point upward until the giant was standing on its tail. In a moment it slipped out of the stall and into the ground in a roar of flames. Les Tower

and Hill, of the Army Air Corps Flight Test Section, lost their lives in the crash. Cause of the crash was determined to be an engaged flight control lock, somehow overlooked during the preparations. The airplane itself was completely exonerated of any structural or aerodynamic defects and on the amazing record, incomplete as it was, of the few flight tests made, a contract for the construction of a service quantity of 13 planes was awarded the Boeing Company.

The 299 was powered by four Pratt & Whitney Hornet R-1690-S1E-G engines rated 750 hp @ 2250 rpm @ 7000 ft. It had a wing span of 105 ft., length 70 ft., and was 15 ft. high. Armament consisted of five .30 cal. manually operated guns located in the nose and in four "blister" turrets on the top, bottom and sides of the fuselage.

YB-17

The service test quantity of 13 bombers was designated YB-17. These differed from the XB-17 in the landing gear, power plants and gun emplacements. The new and more powerful Wright Cyclone GR-1820-G2 engines were fitted to the YB-17 model. These engines are rated 850 hp @ 2100 rpm @ 5800 ft., and for takeoff (one minute duration) at 42 in.

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Hg. they deliver 1000 hp @ 2200 rpm. The double oleo shock strut was replaced on the YB-17 by a large single-strut type with large metal fairings designed to seal the openings in the inboard nacelles after retraction. The turrets remained in their same location but a considerable amount of framework was removed and large, clear formed plastic enclosures installed.

Captain John D. Corkille was assigned to the Boeing plant as Army Air Corps test pilot in July 1936 and flight tests on the new YB-17's commenced towards the end of the year. Lt. Col. Robert Olds of the 2nd Bombardment Group was assigned to the Army service test program by Major General Frank M. Andrews, Commanding General of the G.H.Q. Air Force. Preparations were made at Langley Field, Virginia for the arrival of the new bombers. On March 1, 1937 Captain Corkille lifted the first YB-17 from the field at Seattle, Washington and delivered the monster to Col. Olds at Langley Field. The remainder of the series followed in short order and the twelfth was delivered on August 5, 1937. The thirteenth, and last YB-17, was delivered to the Materiel Division at Wright Field for experimental engineering tests.

The pilots of the 2nd Bombardment Group began service tests on the giant craft and these flights gradually grew longer and more severe. In February 1938 Col. Olds and 48 men flew six YB-17's from Langley Field to Miami, and on the following day headed south, flying 5,036 miles in a day and a half with one stop in a total flying time of 26 hrs. 50 min. finally landing in Buenos Aires, Argentina.

Col. Olds set a Transcontinental East-West record of 12 hrs. 50 min. then turned around and set a new West-East record of 10 hrs. 46 min. in a standard YB-17. A more difficult service test was never given a bomber and the *Flying Fortress* came through with flying colors.

B-17A

As in all government airplane contracts, the YB-17 contract specified the delivery of a structural test model to the Materiel Division. This model is normally a regular production fuselage with wings and tail surfaces ready for assembly but no installations of any kind are included (engines, instruments, equipment, etc.). Wright Field, however, ordered the 14th plane completed in the regular manner and sent to them for experimental tests. In this model four General Electric turbo-superchargers were installed experimentally and an extensive high altitude test program was begun with the first takeoff in January 1939.

This B-17A, of which only one plane was built, featured largely in aviation history. In connection with the celebration of the Air Corps' 30th Birthday on August 1, 1939 it was decided that the B-17A would attempt a record breaking flight. On that day Captain C. S. Irvine piloted the B-17A over a 1000 kilometer course (621.4 miles) carrying a load of 5000 kilograms (11,023 pounds) at an average speed of 259.396 miles per hour smashing the existing World Record held by two Italian airmen. On the same day Captain Irvine carried this load to an altitude of 34,025 feet to break the record set by two German pilots in a Junkers plane. The experimental installation of the turbo-superchargers was proved in every way and it was decided production of the *Fortress*, equipped with this device, should begin at once.

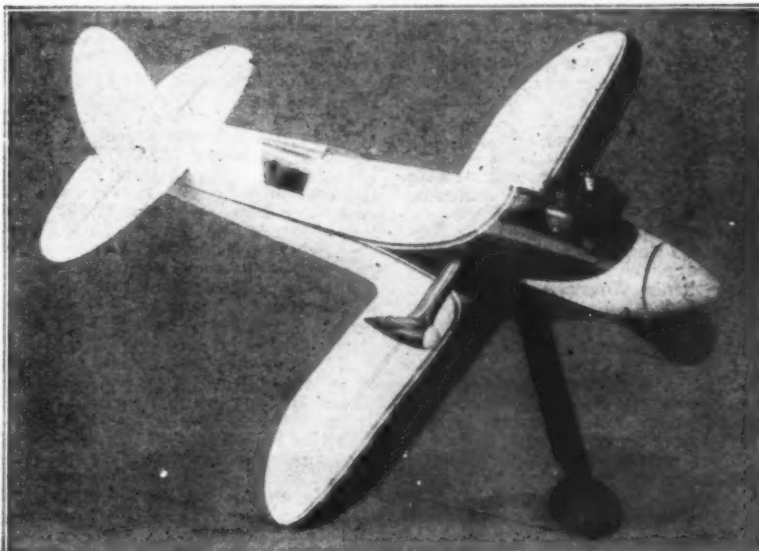
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B-17B

On November 9, 1937 the Boeing Company was awarded a contract for 39 B-17B's equipped with turbos and a later series engine. Four Wright Cyclone GR-1820-G205 engines were installed. These develop 1200 hp for takeoff @ 2300 rpm and the new turbo superchargers made the B-17B the highest flying bomber ever developed. Through subsequent models it has maintained this record. Corkille, promoted to Major for his outstanding work, remained at Boeing in charge of the flight test program. The first B-17B was taken aloft on June 27, 1939 with Major Corkille at the controls, Captain Leonard F. Harman, co-pilot, and Roy O. Grooms as flight engineer. The new model featured a redesigned nose with a flat panel in the lower portion for the bombardier—the deep notch in the nose of earlier models became unnecessary with this new design. A large navigational dome was installed above the cockpit and new Hamilton Standard constant speed full feathering propellers were mounted. Performance was increased accordingly.

The first B-17B was delivered on July 29, 1939 and that morning flew non-stop from Seattle, Wash. to Burbank, Cal. Colonel Stanley Umstead, Chief of the Flight Test Section at Wright Field and Captain Harmon were at the controls. Three days later, on August 1, 1939, the team took off from Burbank, climbed to 26,000 feet and headed east. They dropped down out of the clouds and landed at New York City just 9 hrs. and 14 min. later, clipping an hour and a half from Col Olds record. The plane averaged 265.383 miles per hour smashing the 221 mph record set by a Douglas DC-1 in 1935. The remainder of the contract was delivered early in 1940.

B-17C

Boeing engineers had continued their work on improvements during production of the B-17B's and a contract for a new model, the B-17C, was awarded on the basis of technical data submitted to Wright Field. A total of 38 of the new model was contracted for in the fall of 1939, to be delivered during 1940; this at the time Hitler invaded Poland and the world went to war. Major improvement in the new model included still more advanced engines and new, flush-type gun emplacements. Drag was reduced considerably making this the fastest of all *Fortress* models. The belly gun emplacement was modified in particular, a new "bath tub" design being fitted. Armor plate was fitted to certain vital portions of the fuselage.

With the outbreak of World War II and the great need in England for combat planes, work was rushed on the B-17C contract and the entire quantity completed in November 1940, months ahead of schedule. The British Purchasing Commission received a release from the Army Air Forces and the B-17C went into production for the Royal Air Force. The British designed the *Fortress I* and planes began to arrive in England during the spring of 1941. They were assigned to the Coastal Command and became the first U.S. bomber to be used in stratosphere attacks on occupied Europe.

In Europe the *Forts* became a subject of bitter controversy, some of it deserved but much springing from antagonism toward American equipment. When the *Forts* first went into action they caused consternation with their extremely high altitude bombing technique. The surprise wore off shortly, however, and German fighters began to deal effectively with the big bombers. The *Fortress I*

type was withdrawn from service but valuable data regarding its weaknesses and recommendations for improvements were forwarded to the States for analysis.

B-17D

The *Fortress* production design was hastily modified and new B-17D models included self-sealing fuel tanks, increased armor plating, a new series engine and improved cowl flap arrangement which increased the plane's high altitude characteristics. These modifications were later made on the B-17C models which were redesignated B-17D's. Deliveries on the new model began in the early part of 1941 and the B-17D became the first Army Air Forces heavy bomber to go into action in World War II.

B-17E

It became evident, from battlefield reports on the B-17C, that drastic changes in the *Fortress* were necessary to make it a really effective fighting machine against the fast, heavily armed *Luftwaffe* fighters. The changes included in the B-17D were essential improvements; however, Boeing engineers, working in close cooperation with the Materiel Command at Wright Field, made sweeping changes in the *Fort* with major emphasis on vastly increased armament. The B-17E represented all of the lessons learned both on the European and Pacific fronts.

First step was the addition of a tail gun emplacement. This required a major redesign of the aft fuselage structure with an addition of five feet in length and raising the vertical tail surfaces. Power operated turrets were also a requisite and two of them were installed, one along the upper surface just aft of the pilot's compartment, and the other in the belly aft of the wing trailing edge. Additional gun emplacements were made in the nose, and the complex waist gun positions were modified into simple rectangular openings in the side of the fuselage. An extremely large vertical stabilizer was included to impart greatly increased directional stability, thereby giving the bombardier a steadier platform from which to work. The guns were increased from the standard .30 caliber to .50 caliber and a total armament of twelve .50 caliber machine guns and one .30 caliber machine gun was installed—a move unprecedented in modern airplane design and making the *Fortress* the most heavily armed airplane ever to go into action with a total muzzle energy of 1,990,000 ft. lbs./sec.

The new B-17E first flew on September 5, 1941 and weighed 7 tons more than the original 299 but was 40% faster. It was the first of an order for more than 500 of the type awarded Boeing in the spring of 1941 when war clouds began to shadow the U.S. Following Pearl Harbor and our declaration of war on Japan and Germany, the Army Air Forces began to arm seriously and the production miracle of the aircraft industry went through its birth pains. Contracts for production of the Boeing B-17E were assigned to Douglas Aircraft and Vega Aircraft both in Los Angeles, and the famous B.V.D. Pool was set in operation. As a result of this outstanding example of industrial cooperation thousands of *Fortresses* are now available at the world's fighting fronts.

B-17F

Continuous improvements through design changes featured the production of the *Flying Fortress*, and the B-17F represented still greater advancements in the type. As a matter of fact more than



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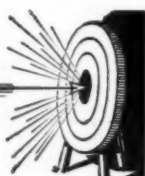
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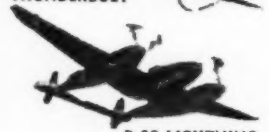
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400 individual changes were made in the type resulting in the new model. Most obvious external differences are the new nose, a larger formed plastic enclosure than used previously, the newer Sperry ball turret, the fitting of external bomb racks carrying two 2,000 pound bombs when required, and the new "paddle" props giving greatly increased blade area with the same propeller diameter which is limited by the *Fortress* landing gear. Electrically heated suit connections, improved oxygen equipment, dust filters on the carburetor air intakes, a stronger landing gear, blackout curtains for the windows, a dual brake system on each wheel, provisions for additional photographic equipment and still more powerful engines are a few of the changes made in the new model, many of which cannot be fully detailed because of security regulations.

B-17G

This latest model of the *Flying Fortress* has been referred to as "possibly the final stage of development of the type" due to the perfection and quantity production of the new B-29 *Superfortress*. Chief change is the addition of a new type "chin" turret containing two .50 caliber machine guns. Power-operated, the new turret is controlled by the bombardier and brings the fire power of the *Fortress* to a total of thirteen .50 caliber machine guns. Waist gun positions have been enclosed in flush panels. The new "electronic" auto-pilot is standard equipment as well as the latest type bomb sight and similar restricted military equipment.

The B-17G has a wing span of 103 ft. 9-3/8 in., is 74 ft. 9 in. long and stands 19 ft. 1 in. high, weighing about 36,000

pounds empty and more than 65,000 pounds fully loaded. It has a top speed in excess of 300 miles per hour, a maximum bomb load of approximately 10 tons and a service ceiling of more than 40,000 feet. It is now active in the Southwest Pacific, the China-India-Burma theater, the Italian-Mediterranean theater, the new Invasion Western Front as well as along the sea and air lanes of the warring world.

The service record of the *Flying Fortress* hardly bears presentation here as no pilot, aircrew member, infantryman, commanding officer, civilian business man, housewife or school child is unaware of the tremendously vital role this famous bomber has played in all our lives. Should the *Fort* be recorded in the final reckoning as the most valuable single airplane of the entire war, neither those who know it intimately nor those to whom it is only a name in every war headline would protest. For none will deny that the *Flying Fortress* earned its full place in the history of man's struggle for freedom just as did *Fortress Monroe* a century and a half before.

VICTORY

Air Ways

(Continued from page 27)

tionally stable and so far every landing has been a good one."

If this job isn't the completely finished work of a master craftsman, then we haven't seen one!

Elmer Slicker, Bergen Pines Hospital, Oradell, New Jersey, sends in Picture No. 5 of his Bell P-39 *Aircobra* and says: "It was built here in the hospital and took six months time. It has planked fuselage, wings, etc. All controls are movable from the cockpit and the wheels retract into the wing. The ship is painted all silver. The landing gear is made of brass." Congratulations, Elmer, on a very fine job and let us hear what your next one is going to be, we're sure looking forward to it!

Comes another letter from our old friend Jose Urteaga who built the Curtiss S03C-1 pictured in our December, 1943 issue.

His latest effort is shown in Picture No. 6 and is a flying scale model of the Grumman *Skyrocket* done up in a special version with liquid-cooled engines. Jose says: "The model is covered with black tissue and wears the Dutch insignia. It is a beautiful plane and is now on display in a bookseller's shop where it is attracting the attention of many people." Jose confides: "Incidentally I sold the Curtiss S03C-1 model for 150 Chilean pesos, which is about \$5.00 American money. It cost me 10c for the kit!"

Picture No. 7 has traveled half-way around the world. It comes from Hyman Balfour Leibman, 96 Fifth Avenue, Highlands North, Johannesburg, Transvaal, South Africa and shows his Interceptor. (Turn to page 56)

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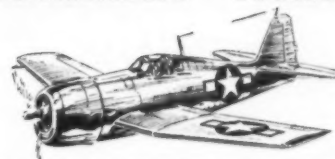
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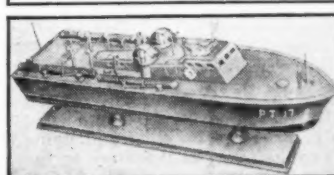
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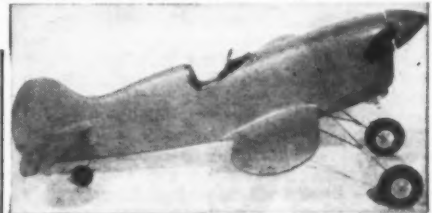
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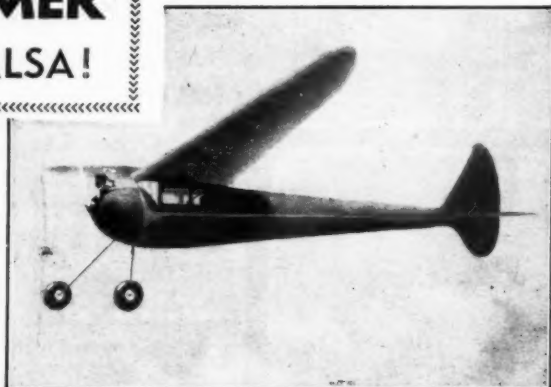
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is due in some degree to the war which has affected everything."

Mr. Leibman it was under just such circumstances that we began our modeling careers here in the United States many of us when there were no model kits, no gas engines, no books on aerodynamics, no supplies and no tools. Those are the circumstances in which a pioneer finds an enormous opportunity for growth and development. But we can tell you one thing: perseverance is the one sure-fire road to success and if you'll keep at it, never faltering or thinking of quitting, you'll find someday that modeling in South Africa will be as popular a sport as it is here in the United States or anywhere else.

Picture No. 8 comes from Nelson D. Wight, Jr. of 619 Robbins Avenue, Philadelphia 11, Pa. You may remember the two pictures in the May issue of Nelson's models. His latest effort is the Bell P-39 Airacobra about which he writes: "The controls, including the flaps, operate from the cockpit and are installed internally. The dash-board contains 45 dials divided into engine instruments, flight instruments and radio dials. The doors are controlled by handles and open and close.

"The left door is complete with a map case which contains a small scale map. The ship has the required number of machine guns and cannon. The canopy behind the pilot is removable and inside is a complete miniature Allison engine model. The plane is covered with aluminum paper and there are 3800 simulated rivets in it, exactly in the pattern of the real ship. It required 275 hours to complete this model."

Nelsons says he is now working on a model Focke-Wulf Fw 190 and we're anxious to see it. However, Nelson's photography certainly doesn't do justice to his models and we suggest, Nelson, that you take your next model to a commercial photographer and have pictures taken similar to the many you see elsewhere in *Air Ways*. The picture may absolutely ruin a beautifully done model but a fine picture of a fine model should be the goal.

Picture No. 9 shows a portion of the modeling efforts of H. W. Arnold, 627 E. 19th Street, National City, California who, we also happen to know, is quite a collector of airplane pictures. Of his models he says: "Here are four of my models, a Consolidated Catalina PBV-5a complete with landing gear with a span of 8 inches, a Consolidated Liberator B-24 with a 6 in. span, and a Bell Airacobra P-39 and Curtiss Warhawk P-40 both of 4 in. span. These models are all made of white pine. I have discovered a new, easy method of making stars for the insignia which I'd be happy to tell anybody who'd like to write me. I'd like to hear from scale model fans as well as airplane photo collectors. I have about 25 of these small models made over a four year period. They are made with a new method of construction I would like to discuss with anyone interested."

Why not drop him a line, fellas?
VICTORY

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He writes: "You most probably know what the conditions near Johannesburg are like due to obstacles, trees, loss of lift due to an altitude of 6,000 ft. above sea-level, etc. These conditions, as you know, make gas modeling very difficult down here. To add to this we find it almost impossible to obtain anything on the market in the way of gas model materials, kits, motors, etc. Colored dopes, wood and various other necessities are unobtainable. Neither of the two gas models I have built have had timers as they are impossible to obtain, even though I advertised extensively.

"I would like to say a few words about the great difficulties under which we operate down here. There is a complete absence of any encouragement on the part of the South African public. As an

example, in Johannesburg, the largest city in the Union, there were exactly three model dealers during peacetime and two of these were owned by the same man.

In schools and other gatherings, if you mention that you are a model builder the most likely comment will be: "You are wasting your time." I was reading a little handbook the other night printed in the U.S. and discovered that the same number of boys are building and flying models in the U.S.A. as there are in the total white population in South Africa; 2,000,000! There are few clubs here and none of them sponsor public meets. About twice a year one club has a meeting. I think this will give you some idea of the lack of interest in model building here at present although I must admit that this

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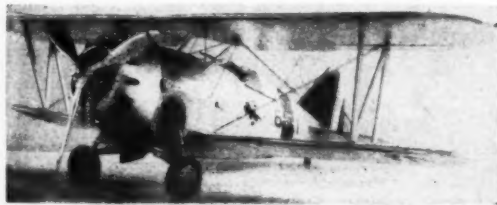
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The best detailed model of this plane on the market. Set has all parts printed, turned wheels, insignia, complete set of paints, glue, etc., full sized drawing, and all parts. Const. set..... **\$3.50**



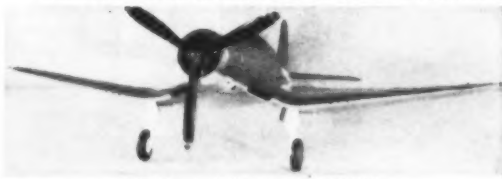
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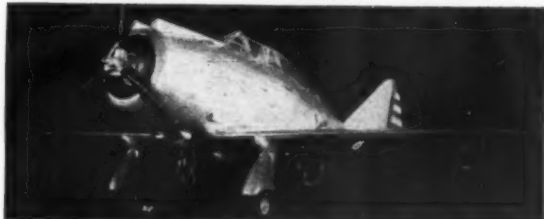
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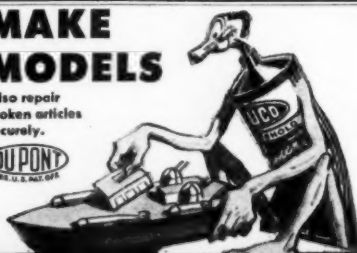
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Flash News

(Continued from page 2)

not only practical but highly advantageous.

And the preponderance of credit for these far-flung successes must go to the Troop Carrier Command of the Army Air Forces whose commanding officers, pilots and men, although organized only two years ago, have delivered assault troops, supplies, medicines and evacuated hundreds of thousands of wounded troops who might otherwise never fight again, around the flaming globe with an unbelievable safety record and high order of reliability and punctuality. Hats off to them!

News of the attack on Japan by Boeing B-29 Superfortresses means that the air war against the Japanese Empire has begun. This news comes just two years and two months after the brilliant attack by General Doolittle and his intrepid crew on Tokyo in a formation of North American B-25 Mitchell bombers. The new raid seems to have been centered on the northern tip of Kyushu island, the southernmost of the Japanese homeland, and the strategic link between this important industrial center and the mainland. The specific targets were Yawata, home of the Imperial Steel Works, Moji, a communications center and Kokura. These targets, all in the vital Shimonoseki area, include the vast Mitsui zinc, coal and dye production centers and indicate that the raid was the opening of a strategic offensive by air against Japan, rather than another morale attack as was Doolittle's. Most important conclusion to be gathered from the raid is the simultaneous offensive

operations in Europe and in Japan, on opposite sides of the globe, an index to the mighty weight of our equipment and men now scattered, in large force, throughout the world.

Details of the Superfortress (see page 13) included an announcement that they were a part of the new 20th Bomber Command, nucleus of the global 20th Air Force which will have no single theater for its base but will function as a huge task force under the personal direction of General Henry H. Arnold. Formations of Superfortresses will be ordered to various target areas much as a giant Naval task force is directed and this indicates an entirely new concept of Airpower now in the making.

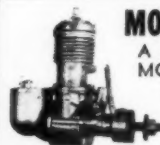
The Germans have at last launched their "secret weapon" against the Allies and it is everything they have been claiming. Essentially, it is a flying bomb composed of a rocket-driven power plant, wings and tail and an automatic pilot. The gadget is launched from the Pas de Calais region with its course pre-set by the gyro units. Driven by a rocket motor, it sails across the Channel, normally about 3,000 ft. and flies over southern England. At a pre-set time it discards its wings and motor and plummets to earth with a resulting explosion. These bombs are sent over England both at night and in broad daylight. While it would not be fact to minimize the effect of these gadgets it might be pointed out that it is very difficult to take into account the drift caused by changing winds and the time element both of which are necessary to achieve any accuracy. Highly inaccurate, then, the bombs will do no major damage to military installations. However, they can and do destroy human lives and buildings wherever they may come down.

News of the new "shuttle bombing" technique has been released and, although this has been used between England and Italy for some time, its use between England and Russia solves a complex controversy which has raged for months. The Russians have found little use for heavy bombardment against Germany because her prime strategic problem as well as mission has been to clear the Germans from Russian soil which is largely a job for the infantry, fast moving artillery and low-flying Stormovik ground cooperation planes. The vast, empty areas of the Ukraine hold little target for heavy bombardment. The prime mission of the British-American aerial offensive has been the destruction of German manufacture which is the single purpose of heavy bombardment. The new shuttle raids are entirely an American function, the airports and sup-

(Turn to page 60)

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plies in Russia being laid out and operated by AAF personnel. The trip from London to Berlin is some 650 miles all through a veritable hell of flak and Luftwaffe fighters. This means 1300 miles of extremely tough going for our bombers, a distance which is just a little too long for satisfactory fighter operation. From Berlin to Russian lines is only about 450 miles and this through comparatively undefended territory, largely Poland. Thus Bomber Command trips are now only one way with a landing at the other end. It is a progressive move with large tactical advantages which will be felt by the enemy in ever increasing fury.

The development of new types of combat planes and new modifications of standard versions continues, evidence that the war is a long way from won but that research towards perfection is doing all in its power to win it. The latest Republic Thunderbolt (see page 14) features the popular "tear-drop" enclosure first applied to the Hawker Typhoon and more lately to the North American Mustang. Oddly enough the new Thunderbolt is not a new airplane but the standard P-47D has been converted into the new model. This is a fine example of the work of the many Modification Centers whose job has been a large and complex one and whose work has been largely unsung. Early in the war it became evident that a new plane could be completed by the factory while an old one was being reworked with the latest improvements. The problem then, as now, was the production of large numbers of airplanes and the AAF wisely decided that the factories should concentrate on the production of as many airplanes as they were capable of delivering. The work of adding the latest refinements was assigned to Modification Centers where the problem was no less complex and demanded no less skill not only in engineering but in workmanship. Manpower has been the major problem with the Centers but they have, somehow, licked this problem as well as many others and every combat airplane now in use by the AAF throughout the world has been through a Modification Center, which paints a rough picture of the scope of their operations. With vastly increased airplane production by the factories the work at the centers was multiplied every time a new production record was set. The job they are doing is magnificent and they, again, are a part of the untold story of America's War Effort.

Public announcement has at last been made of the use of rocket shells launched from AAF fighter planes in the South Pacific. Although long in use this development has been kept under cover by the AAF for obvious reasons. Specifically mentioned were Lockheed Lightning, North American Mustang, Republic Thunderbolt fighters and Douglas Havoc bombers. The British have released photographs of the Bristol Beaufighter equipped with rocket launching racks. It seems safe to believe that fighter and medium bomber craft so equipped took part in the invasion and will play a heavy role in the fighting. Although this news comes many months after the release of information on German rocket-equipped fighters, no connection between the two should be made and certainly not the old "steal" cry. Rocket development programs in England and the U.S. have proceeded quite apart from those in Germany and Allied mechanisms were developed on a par with those of the Luftwaffe almost simultaneously. However, the Germans were driven to use their rockets in desperation and no nation had any idea

about the practical value of them in air combat prior to that time. The Germans certainly did prove first that they were indeed practical as our losses on raids encountering them showed clearly. There is, however, a slight difference in their tactical use, the Germans using them principally from long range to break up close bomber formations and the AAF and RAF using them in the South Pacific largely against ground targets such as the infantry uses the bazooka. The rocket shell is practically useless in attempting to down an individual enemy fighter plane in a dogfight but is highly effective against large bomber formations and ground installations in which a high degree of accuracy is not a critical consideration.

The vague rumblings of "termination" are being heard, possibly the most drastic being undertaken at Brewster Aeronautical Corp., where the firm's contract for the production of complete Vought Corsair fighters, known as the F3A-1, was cancelled. This action, however, was precipitated by management, labor and production problems at the plant rather than by the fulfillment of Navy demands for the Corsair. Douglas Aircraft's production of A-20 Havocs is, however, a move simply to terminate production of the type. It will be replaced shortly by the A-26 which, contrary to popular belief, is not a modification of the standard Havoc but is an entirely new and far advanced type. The production of training planes has been completely halted, the majority of the contracts being terminated several months ago. Boeing B-17 Flying Fortress (see page 19) production has been curtailed and may possibly be discontinued altogether shortly due to the change-over to B-29 Superfortress production, which is now slightly ahead of schedule. These changes are the result of tactical requirements, however, and are simply in line with the development and perfection of more advanced types.

Premier Curtin of Australia has announced that his country will manufacture heavy bombers shortly and the guess is that the type, although unannounced, will be the Avro Lancaster. Production of the giant bomber in Australia, aside from its remoteness from enemy attack, will make delivery of the type to the China-Burma-India theater much more convenient than the necessity for flying them from Canada and England, as at present.

The OWI announces that more than 7,800 aircraft, most of which are combat types, have been supplied Russia by the United States. More than 3,000 of these were supplied by air and about 5,000 of the total were delivered during 1943. The majority of the types has been Bell Aircrafts, Douglas Havocs and North American Mitchells.

Henry Ford may again make history with his announcement that he plans to purchase Willow Run from the government and manufacture a large multi-engine passenger and cargo airliner following the war. He also plans to build the type in his factories in England which, at present, are producing Rolls-Royce Merlin engines.

We may recall the announcement from Germany early last Fall that the aircraft manufacturing industry would concentrate on the production of fighter planes (defensive equipment) and that bomber production would be curtailed. According to the OWI the Japanese have just made a similar announcement!

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Vought has completed the 3,000th Corsair F4U-1 fighter.

The Navy has enlarged its program of land-based bomber operation and has established a school at Naval Air Station, Hutchinson, Kansas, for the training of pilots and crews of Consolidated Liberator PB4Y-1 bombers as teams. In command is Comdr. W. C. King who sends the crews directly overseas for duty upon graduation.

The record-breaking Lockheed Constellation, which broke the transcontinental record recently, carried TWA markings although the plane was actually a standard Army C-69. News now comes that the plane has been released officially to TWA and that others on the production lines will be turned over to them from time to time.

The 1945 Navy Appropriations Bill specifies the production of 24,230 new airplanes for the fleet which will bring the total number in use to 37,735. Existing appropriations provide for more than twice this number but losses and obsolescence will cut the total to the 37,735 figure. Delivery of the new planes is expected in from 12 to 15 months following the signing of orders during the 1945 fiscal year.

Specifically mentioned in the bill are five fighter types, two torpedo types, four heavy bomber types, two transport types and one scout-observation type in the amount of 22,930 planes, all of which are said to be existing types. The remainder, 1300 planes, will be new types. Fighters will be produced in the amount of 13,020.

Special versions of the Consolidated Liberator are now in action with a battery of six aerial cameras. The modifications on the standard bomber type are made at the Northwest Airlines Modification Center at St. Paul, Minnesota. The two Liberators which took the first flight pictures of Truk enabling our Navy task force to more effectively plan their attack were converted at St. Paul. Hundreds of others are now in action on photo-reconnaissance missions.

The Martin Mariner PBM-3 is now in service with the Royal Air Force Coastal Command where it is known as the Mariner I. This marks the first service of this plane with the British. And speaking of Martin planes, the famous Marauder is the only combat airplane of U.S. manufacture which has NOT been purchased, assigned or used by either the R.A.F. or the air forces of any of the other Allies. The type has been one of the most valuable airplanes produced and certainly its performance is better than any other medium bomber. Perhaps the fact that it is reportedly a little "hot" may explain the fact that only U.S. pilots fly it!

The North American Mustang has been officially credited with a top speed of 425 miles per hour, certainly one of the fastest airplanes ever built and possibly the fastest now in service.

The French Gnome-Rhone firm, widely known engine designers and builders, have recently completed an air-cooled radial aircraft engine having four banks of seven cylinders each—28 in all. A cooling fan is mounted and the engine has a displacement of 2929 cubic inches. Power output is claimed to be 3700 horsepower at 20,000 feet which, if true, proves that French engineers have lost none of their skill under the occupation.

A new German night fighter has been introduced, the Heinkel He 219 which is a twin-engine type. No details concerning it have been published but it appears to be a development of the original He 219 which was designed as a dive-bomber.

Another new German product is the Arado Ar 240 which is a twin engine fighter-bomber type. The Messerschmitt Me 410 is the familiar Me 210 twin-engine type with more powerful engines. The Me 310 is, likewise, a standard Me 210 but with the barbette machine guns removed.

Confusion over the Hawker Typhoon and the Hawker Tornado has at last been cleared up. The Tornado was rumored in existence for many months and when the new British fighter appeared it was announced as the Typhoon. Many have wondered what happened to the Tornado if it existed and whether or not the name Typhoon was selected at the last moment. Actually there was a Tornado. In answer to an Air Ministry specification the Hawker firm built two identical airplanes, one powered with the familiar Napier Sabre engine (which emerged as the reknown Typhoon) and the other powered with a Rolls-Royce Vulture engine. Both of these engines are 24 cylinder "X" types but the Vulture did not adapt itself to mass production and only a few were built. In this manner only three Hawker Tornado fighters were built and the type was abandoned—temporarily. Actually there is a development of it now in action about which we can say nothing at present.

General Barton K. Yount announces that numbers of North American Mitchell bombers, redesignated AT-24, are now being used as advanced training planes in his command.

Some idea of the high altitude capacity of modern anti-aircraft guns may be gained by an official report of a British ack-ack unit knocking off a Messerschmitt Me-109G at 36,000 ft.!

The Navy has given the "go ahead" to Consolidated-Vultee for the production of the Seawolf torpedo-bomber, a three-place giant designed by Vought. The plane will be manufactured at Consolidated-Vultee's Allentown, Pennsylvania, plant and, according to Rear Admiral Ralph E. Davison, Navy Bureau of Aeronautics, it "incorporates everything we have learned about planes of this type." Designated TBY-1, the new craft is "heavily armed and armored and there is no other torpedo plane in the world to match it."

The actual times and details of the record-breaking flights by two North American Mustang P-51D fighters have been released. It is an amazing record of speed and range. Colonel Clair Peterson flew non-stop from Inglewood (Los Angeles), California, to LaGuardia Field, New York City, in an elapsed time of 4 hours, 31 minutes and 30 seconds which indicates a speed of roughly 400 miles per hour all the way. Lieut. Colonel Jack H. Carter took off with Peterson but stopped at Kansas City to refuel. His total time was 6 hours and 25 minutes, faster than 400 miles per hour. The stop off for fuel enabled Carter to fly his plane faster, the additional fuel consumption making the stop necessary. The 6 hrs. 25 mins. it will be borne in mind, included the stop at Kansas City!

The British have not permitted Lend-Lease to become a strictly one-way flow of material, at least not with airplanes. An announcement has been made that the Army Air Forces have received a total of 1,100 British designed and manufactured airplanes including many Spitfire fighters and Beaufighter fighter-bombers. In addition the British have sent 4,100 planes to Russia. The Royal Navy is now operating 30 convoy-escort carriers built in the U.S. and leased for the duration. Britain has produced 90,000

airplanes since the war began and has supplied more than 75% of the planes now being operated by the Royal Air Force and the Fleet Air Arm. The British have delivered 35,000 droppable fuel tanks and 43,000 internal tanks to the U.S. 8th and 9th Air Forces in England. They are now producing 22,000 per month. The British Fleet units operating in the Indian Ocean are equipped with Vought Corsair and Grumman Hellcat fighters.

Vice Admiral Aubrey Fitch has replaced Vice Admiral John S. McCain as Deputy Chief of Naval Operations for Air. McCain's new post has not been announced.

There is a total of more than fifty-two billion dollars in aircraft supply contracts now in process in the United States, says the War Production Board. California, Michigan and New York hold contracts in that order of quantity.

More details have come to light on the plan to build the Douglas C-54 Skymaster in Canada. Canadian Vickers, Ltd., of Montreal, has signed a contract calling for the production of 50 Skymasters at a cost of \$350,000 each. The first plane will be delivered within 13 months after receipt of complete drawings from the Douglas company. The deal is sponsored by the Canadian Government, Vickers building the planes on a straight 2% commission. Douglas spokesmen have not yet spiked the rumor that Douglas has or will make similar commitments to other foreign countries.

The complete relief of transport plane shortage seems to be in sight with the Army announcing the release of additional planes to the airlines. The companies and the Army had agreed previously that 200 transports would be required and would be delivered and maintained by the airlines (including airline planes already in use). This ceiling has now been upped to 300 planes. A total of 18 planes have been turned over to the airlines recently but the latter are not too happy over the deal insofar as they insist on DC-3 airliners. The Army has offered Lockheed Lodestars and 14's, Douglas DC-2's and Boeing 247's but the airlines argue that spare parts for these types are unattainable. The Army believes that all contracts with airlines under the ATC program will be fulfilled this year and that the Air Transport Command will be able to fulfill its own requirements with its own planes and crews. This will relieve hundreds of airline pilots and crewmen for duty with their airlines.

Lord Beaverbrook recently gave a survey of British post-war transport plane development to the House of Lords. He mentioned the Avro York (converted Lancaster bomber) and stated that it was being produced in small quantities for the R.A.F. Transport Command, the Handley-Page Halifax transport, developed from the bomber and a new Shetland transport, which is ready for test flights but will not go into production immediately. He also made reference to a small De Havilland feeder line transport which is scheduled to fly in about a year. The Tudor was said to be delayed because of military work at the plant and would not be completed for some time.

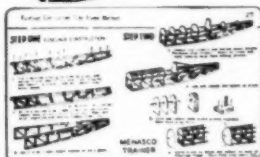
Yet another helicopter is now nearing completion this one being the product of Vincent Bendix. The craft is egg-shaped and has no tail surfaces. The two rotors are counter-rotating.

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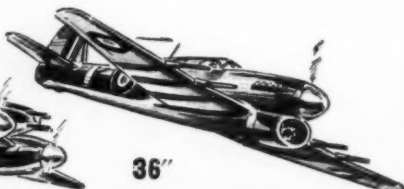
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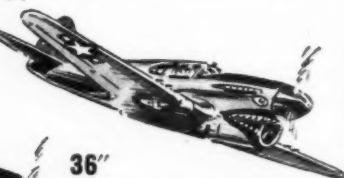
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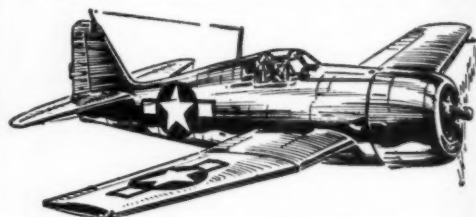
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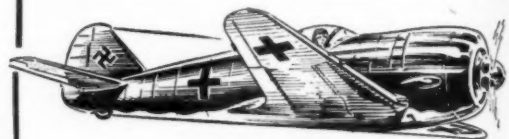
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